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TO THE

ENCYCLOPÆDIA BRITANNICA

(NINTH EDITION.)

A DICTIONARY OF

ARTS, SCIENCES AND GENERAL LITERATURE

BY

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EADIE—EAGLE PASS.

EADIE, JOHN, a learned Scotch divine, was born at Alva, in Stirlingshire, 9th May, 1810. He studied at the university of Glasgow, and was licensed in 1835 as a preacher of the United Secession Church, in which, soon after, he became minister of a Glasgow congregation—a post he retained after its union with the Relief Church (1847) as the United Presbyterian Church. From 1848 to the close of his life he also lectured on the exegesis of Scripture in the theological college of his church. He received the degree of LL.D. from Glasgow in 1844, and of D.D. from St. Andrews in 1850; was moderator of the synod of his church in 1857, and was one of the original members of the New Testament Revision Company. He died 3d June, 1876. Eadie maintained throughout life an incessant literary activity. If not an exegete of the highest order, he possessed wide learning and great power of exposition. Few books are more generally useful and more intelligible to the non-theological reader than his *Biblical Cyclopædia* (1848), and his *Ecclesiastical Encyclopædia* (1861). Sound contributions to New Testament exegesis were his commentaries on St. Paul's epistles to the Ephesians (1854), Colossians (1856), Philippians (1857), Galatians (1869), and Thessalonians (posthumously, 1877). His latest work was *The English Bible* (2 vols. 1876), a learned and yet popular history of the English translations of the Scripture. See his *Life* by Dr. James Brown (1878).

EADS, JAMES BUCHANAN (1820-87), an American engineer. At the age of 13 he settled in St. Louis, and in 1842 constructed a diving-bell boat. Afterwards he built several boats for raising large steamers. In 1845 he established the first glass-works west of the Mississippi. In 1861 he constructed eight iron-clads in 100 days, and these steamers were employed in the capture of Fort Henry in February, 1862. Later he built many other iron-clads and mortar boats. For seven years from 1867 he was engaged in the construction of the steel arch bridge across the Mississippi River at St. Louis. Subsequently he deepened the Southern Pass at the mouth of the Mississippi by means of jetties, and outlined a plan to deepen the river from the Gulf of Mexico to the mouth of the Ohio. Congress appropriated a large sum of money for the work, but discontinued the appropriation after the plan had been shown to be practicable. He afterwards formed a company to build a ship railway across the Isthmus of Tehuantepec. He was connected with various other enterprises.

EAGLE, a gold coin of the United States of America, of the value of ten dollars.

EAGLE, used heraldically, is an emblem of magnanimity and fortitude. It is variously represented, the best known mode being displayed, or spread out, either with two heads—as in the arms of the German Empire, in which case it is popularly known as a spread eagle—or with one head, as in the arms of the kingdom of Prussia.

EAGLE, as a military standard, adopted by the Romans, and even by nations preceding them in history. The Persians, in the time of Cyrus the Younger, bore an eagle on a spear of a standard. The Roman eagle, sometimes of gold, but more frequently of silver, was about as large as a pigeon with extended wings, and was borne on the top of a spear, with a cross-bar or shield to support it. In modern times, France, Russia, Prussia, Austria and the United States have all adopted the eagle as a national military symbol.

EAGLE, BLACK, ORDER OF THE: in Prussia, an order founded by the Elector of Brandenburg, on Jan. 17, 1701, the day of his coronation as king of Prussia. The number of knights, in addition to the princes of the royal family, was originally 80, but is now unlimited. They must at their nomination be at least 30 years of age, and their noble descent for four generations is necessary. The insignia of the order consists of an octagonal cross of blue enamel, and eight black eagles displayed between the arms of the cross. The cross is suspended by a broad ribbon of orange color across the left shoulder, and it is accompanied by an embroidered silver star, fastened on the left breast. Knights of the Black Eagle are likewise knights of the Red Eagle, first-class.

EAGLE-HAWK (*Morphus*, or *Spizætus*), a genus or sub-genus of *Falconide*, of the eagle group, but consisting of species of comparatively small size, and characterized by short wings, long, slender legs (*tarsi*), and comparatively feeble toes and claws. They are natives of warm climates, chiefly of South America, but also of Africa and the East Indies.

EAGLE-OWL (*Bubo*), a genus of the owl family (*Strigide*), characterized by a somewhat incomplete facial disc, two tufts of feathers (*horns* or *egrets*) of considerable size on the head, ears with small openings (*conchs*), legs and toes covered with feathers, short, strong curved bill, and long curved sharp claws (see *Britannica*, Vol. XVIII, p. 90). To this genus belong the largest of the nocturnal birds of prey. The eagle owl of Europe (*Bubo maximus*) is little inferior in size to the golden eagle, and preys on quadrupeds such as hares, rabbits, and young deer, and on grouse, partridges and other kinds of game. It seizes its prey with its feet, and seldom touches it with the bill till its struggles are over. It is an inhabitant of many parts of Europe and Asia, but it is only an occasional visitor in Britain. The eagle owl of America (*B. Virginianus*), the Virginian horned owl, or great horned owl, is very similar to the species just noticed, but of inferior size, although still a large and powerful, as it is also a bold, bird. It carries off with ease almost any inhabitant of the poultry yard. It is found in almost all parts of America.

EAGLE PASS, the county-seat of Maverick county, Texas, on the Rio Grande River, 248 miles southwest of Austin. Population (1890), 3,000.

EAGLE, RED, ORDER OF THE, in Prussia, founded in 1734 by the Markgraf George Frederick Charles. After passing through various modifications, the order was raised in 1791 by Frederick William II. to the rank of the second order in the monarchy, and the decoration of a white enameled Maltese cross, surmounted by a royal crown, with the Brandenburg eagle in the corner, was adopted.

EAGLE ROCK, a village of Bingham county, Idaho, on the Snake River. It is the market place for a large part of Snake River valley.

EAKINS, THOMAS, artist, born in Philadelphia, July 25, 1844; studied in Paris under Gérôme and Bonnat. He has exhibited in Paris and in this country, and is connected with the Art Students' League of Philadelphia.

EARLE, PLINY, born in Leicester, Mass., Dec. 31, 1809. He was physician at Bloomingdale Asylum 1844-49, and superintendent of the State hospital for the insane at Northampton, Mass., for more than 20 years. He was a prominent member of the American Medical Association, the New York Academy of Medicine, and other societies, and has been a frequent contributor to medical journals.

EARLY, JOHN, born in Virginia, Jan. 1, 1786; died Nov. 5, 1873. He became an itinerant Methodist preacher in 1807. In 1854 he was elected bishop and held that office until his death. He was one of the founders of Randolph-Macon College.

EAR: in music, a figurative expression, meaning the possession of a sensitive, just, and delicate appreciation of sound and measure.

EARLVILLE, a village of La Salle county, Ill., 74 miles southwest of Chicago. The place has manufactories and a steam mill.

EARLY ENGLISH: in architecture, the term generally applied to the form of Gothic in which the pointed arch was first employed in England. The early English succeeded the Norman towards the end of the 12th century, and merged into the Decorated at the end of the 13th. Its characteristics are peculiar. Retaining much of the strength and solidity of the earlier style, it exhibited the graceful forms, without the redundancy of ornament which latterly degenerated into a fault in that which followed.

EARLY, JUBAL ANDERSON, an American soldier, born in 1816. He served in the Florida war in 1837-38, and then began the practice of law in Virginia. He was a member of the legislature in 1841-42, and Commonwealth attorney from 1842 to 1847, and again from 1848 to 1852. He served in the Mexican war, and in 1847 was acting governor of Monterey. At the beginning of the civil war he entered the Confederate army as a colonel, and later became brigadier-general. After the war he visited Europe, and later resumed his law practice in the South.

EARNEST, or ARLES, as it is called in Scotland, a small sum of money which is given, or a simple ceremony, such as shaking hands, which is performed in proof of the existence of that mutual consent which constitutes a contract. In the first case the earnest is said to be pecuniary; in the second, symbolical. It is not the earnest but the consent, the agreement to a certain price; that is the root of the bargain; and the earnest thus becomes a mere adminicle of evidence, which may be dispensed with even in cases in which it is exacted by custom, if the parties choose to preserve other evidence of the completion of their bargain.

EARS, a term in organ building given to small projecting pieces of metal on the sides of the mouths of metal pipes, put on for the purpose of assisting the pipes to speak promptly, especially when the organ is of small scale.

EARTH ALMOND, or CHUFA, a species of sedge, *Cyperus esculentus*, whose tuberous roots are used in the South of Europe as a vegetable and in making a popular drink called *orchatas de chufas*. It has been successfully grown in the warmer parts of the United States, and has been recommended as a substitute for coffee.

EARTH-HOUSES, EIRD-HOUSES, or YIRD-HOUSES, the name which seems to have been generally given throughout Scotland to the underground buildings, which in some places are called also "Picts' Houses," and in others, it would appear, "weems," or caves. The earth-house, in its simplest form, is a single irregularly shaped chamber, from 4 to ten feet in width, from 20 to 60 feet in length, and from 4 to 7 feet in height, built of unhewn and uncemented stones, roofed by unhewn flags, and entered from near the top by a rude doorway, so low and narrow that only one man can slide down through it at a time.

EARTHS: in chemistry, a class of substances which were regarded by the alchemists and older chemists as elementary, and which are insoluble in water. The earths *proper* are now known to be compound, consisting of a metal in combination with oxygen. The list includes alumina, glucina, zirconia, thoria, didymia, lantana, ceria, yttria, terbia, and erbia. They do not alter vegetable colors, are soluble in acids, and are precipitated from their solutions by ammonia, potash, or soda.

EARTHWORM (*Lumbricus*), a genus of *Annelida*, of the order *Terricola*. There are many species, all of them pretty closely resembling in characters and habits the common earthworm or dew-worm (*L. terrestris*). See *Britannica*, Vol. XXIV, p. 677. It has no head distinct from the body, no eyes, no antennae, nor any organs external to the rings of which its body is composed, except minute bristles pointing backwards, of which each ring bears four pairs, and which are of use in its locomotion. It sometimes attains to nearly a foot in length, and more than 120 rings have been counted in its body. The end at which the mouth is situated is pointed and the tail is flattened, while the general form is cylindrical. The mouth consists merely of two lips, the upper lip elongated; there are no teeth nor tentacles, and the worm subsists by swallowing fine particles of the soil, from which its digestive organs extract the digestible matter, the rest being voided often in little intestine-shaped heaps, called *worm-casts*, on the surface of the ground. The locomotion of the earthworm is effected by means of two sets of muscles, which enable it to contract and dilate its rings; its bristles preventing motion backwards, and the whole muscular effort thus resulting in progress, while the expansion of the rings, as it contracts the anterior segments, and draws forward the hinder parts, widens a passage for it through earth whose particles were close together before. Earthworms are thus of very great use, their multitudes continually stirring and loosening the soil through which they work their way; and moles, pursuing them for food, stir and loosen it still more; while worm-casts gradually accumulate on the surface to form a layer of the very finest soil, to which it is supposed that the best old pastures in a great measure owe their high value.

EAR TRUMPET, a contrivance for improving the hearing of the partially deaf. The principle in them all is the same—to collect the sonorous vibrations, and to convey them in an intensified form to the deeper part of the ear. In this way, the hand, placed behind the external ear, constitutes the simplest form of ear-trumpet. There are many varieties of trumpet in use. The most useful and comfortable are those which are worn on the head,

and which go by the name of ear-cornets or acoustic auricles. They can be concealed under the hair or cap, and may be adapted to one or both ears by means of a spring over the head. The apparatus most commonly in use requires to be held in the hand, and consists of a narrow portion which is inserted into the ear-passage, and which gradually expands into a wide mouth. Another variety, applicable to the more severe cases of deafness, consists of an elastic tube, one end of which is tipped with ivory, and is placed in the ear of the patient; the other is held in the hand of the speaker, who applies his mouth to the open extremity. With this instrument only one voice can be heard at a time. With the first-mentioned variety, general conversation can be heard often quite well.

EASDALE, a small Scottish isle on the west coast of Argyllshire, in the Firth of Lorn, ten miles south-southwest of Oban. It contains one and a half square miles, and is situated in Kilbrandon parish.

EAST: vaguely speaking, that quarter of the horizon where the sun rises, or which a person with his face to the south has on his left hand. It is only at the equinoxes that the sun rises exactly in the east point. A line at right angles to the meridian of a place points exactly east and west.

EAST AURORA, a village of Erie county, N. Y., situated in a rich farming section. It is 17 miles southeast of Buffalo. Population (1890), 1,582.

EAST BRADY, a village of Clarion county, Pa., on the Alleghany River, 70 miles north of Pittsburgh. The Brady iron works are just across the river, and furnish employment to 1,500 persons. This village is near the Butler county oil regions, and considerable oil is brought in pipe lines to the village, and then shipped. Population (1890), 1,228.

EAST BRIDGEWATER, a post-township of Plymouth county, Mass., 25 miles southeast of Boston. It has excellent water-power, and is a thriving manufacturing place. Among the articles made here are brick, cotton-gins, iron, chains, nails, boots and shoes. Population (1890), 2,911.

EASTBURN, MANTON (1801-72), an American P. E. bishop. He was ordained in 1822, and for the succeeding five years was assistant minister in Christ Church, New York. In 1827 he became rector of the Church of the Ascension. In December, 1842, he was consecrated assistant bishop of the diocese of Massachusetts, and two months later became bishop. He published several works on religious topics.

EAST CAPE, the name of the most easterly headlands of the island of Madagascar, of the North Island of New Zealand, and of Siberia or Asiatic Russia. The *first* is in lat. 15° 20' S., and long. 50° 15' E.; the *second* in lat. 37° 40' S., and long. 178° 40' E., being almost precisely the antipodes of Carthage in Spain; and the *third* is that extremity of the Old World which is nearest to the New, being separated by Bering's Strait from Cape Prince of Wales in America. It is in lat. 60° 6' N., and long. 169° 38' W.; or rather, to follow the natural reckoning, 190° 22' E.

EASTMAN, JOHN ROBE, born in Andover, N. H., July 29, 1836; graduated at Dartmouth in 1862. He became professor of mathematics in the United States navy, and is a Fellow of the American Association for the Advancement of Science, and a member of many scientific societies. He is best known in connection with astronomical research.

EASTER, the passover, the festival of the resurrection of Jesus Christ. The proper time for the celebration of Easter has occasioned no little controversy. The Eastern Christians celebrated Easter on the 14th day of the first Jewish month or

moon, as being equivalent to the Jewish passover. The Western churches celebrated it on the Sunday after the fourteenth day, holding that it was the commemoration of the resurrection of Jesus. The Council of Nice (325 A. D.) decided in favor of the Western usage, branding the Eastern usage with the name of the "quartodeciman" heresy. The time of Easter, being the most ancient and important of all the movable feasts of the Christian Church, determines all the rest. It must fall between March 22 and April 25.

EAST HADDAM, a township of Middlesex county, Conn., on the Connecticut River. It contains a music-seminary, three, Britannia shops, and thirteen cotton-mills. Population (1890), 2,599.

EAST HAMPTON, a manufacturing town and railroad junction of Hampshire county, Mass., five miles southwest of Northampton. The place contains Williston Seminary for young men, and a public library, and has manufactories of pumps, vulcanized rubber, suspenders, thread and buttons.

EAST HUMBOLDT MOUNTAINS, a high range of mountains in Elko county, Nev., extending north and south. Ruby Valley is on the east and Hunt-ington Valley on the west, while Secret Valley and Fremont Pass cut the range, some of whose peaks exceed 12,000 feet in height.

EAST INDIA ARMY. When the East India Company first sent factors or agents to India, an army was not thought of. Military forces arose out of the exigencies of the times. Some of the first troops in the Company's pay were mere adventurers, some were liberated convicts, some deserters from European armies. Gradually organization was introduced and improved arms furnished. As the power of the Company increased, natives entered the battalions, until at length most of the troops were Hindoos or Mohammedans, drilled by non-commissioned officers sent out from England. A few regiments were raised in India; but all alike were officered by the Company's favored English officers. The ranks were filled by enlistment; the Company never compelled the natives to become soldiers; the pay offered was always such as to induce a sufficient number of men to enter. Their periods of leave of absence were liberal; and after a certain number of years' service they retired on a pension sufficient to support them for the remainder of their days. At the period immediately preceding the outbreak of the revolt in 1857, the army in the pay of the Company comprised about 24,000 royal troops (lent to, and paid for by, the Company); 18,000 European troops, raised and drilled by the Company in England; 180,000 native regulars, and 60,000 native irregular horse—making about 280,000 in all. This large force was irrespective of 40,000 contingents furnished by dependent native princes, and of the native armies belonging to the independent and semi-independent princes. In August, 1858, the act which transferred the government of India from the Company to the crown received the royal assent, and the army was transferred as well as the political power.

EAST LIVERPOOL, a city of Ohio, near the eastern boundary of the State, on the Ohio River, and in Columbiana county. It is on the Cleveland and Pittsburgh railroad, 24 miles above Steubenville, and 44 miles west-northwest of Pittsburgh, Pa. Its chief industry is the manufacture of stoneware, earthenware, terra-cotta, graniteware and yellowware. Population in 1880, 5,568; in 1890, 10,947.

EAST MAIN, formerly a portion of the Hudson Bay territories, now incorporated in the Dominion of Canada. It is bounded north by Hudson Strait and west by Hudson Bay down to its southern extremity, meeting Labrador on the east and Canada on

the south. This immense region, thrice as large as Great Britain, is generally bleak and sterile, yielding little to commerce but fish-oil and a few furs. A river of the same name, otherwise called the *Slade*, crosses its southern section, entering Hudson Bay, here known as James Bay, about lat. 52° 15' north, after a course of 400 miles.

EASTMAN, MARY HENDERSON, an American authoress, born in Va. in 1818; married Capt. Seth Eastman in 1835, and resided with him at various frontier stations. She has published numerous books on Indian life, and also many stories in magazines. She wrote *Aunt Phillis's Cabin*, a reply to *Uncle Tom's Cabin* by Mrs. Stowe.

EASTMAN, SETH (1808-75), a United States soldier. In 1829-33 he was on frontier duty; in 1833-40 was assistant teacher of drawing at West Point; in 1840-41 was in the Florida war, and later on the western frontier. He was retired in 1863, and in 1866 was brevetted brigadier-general. He wrote a *Treatise on Topographical Drawing*.

EASTON, the county-seat of Talbot county, Md., situated in a fine fruit region on a branch of the Great Choptank River. It has several schools, an orphan asylum, gas works, peach-canning and fruit-drying establishments, and manufactories of lumber, farm implements and castings.

EASTON, a manufacturing township of Bristol county, Mass. It produces boots, shoes, thread, shovels and hinges. Pop. (1890), 4,493.

EASTON, a city of Pennsylvania, and county seat of Northampton county (see *Britannica*, Vol. VII, p. 616). Easton is delightfully situated on the right bank of the Delaware River, at the mouth of the Lehigh. A chain bridge across the Delaware connects it with Phillipsburg, N. J. It is an important railroad center, being on the Delaware, Lackawanna and Western, the Lehigh Valley, the New Jersey Central, the Belvidere Delaware, the Easton and Amboy, and the Lehigh and Susquehanna railroads. It is the outlet of a rich agricultural region, and has various manufactories, as well as iron works, tanneries, machine shops and paint works. Lafayette College (Presbyterian) is located at Easton. Population in 1880, 11,924; in 1890, 14,185.

EASTON, NICHOLAS (1593-1675), a governor of Rhode Island. He was one of the first settlers in Newbury, Mass., and also in Hampton, N. H., but moved to Rhode Island in 1638, and built the first house in Newport. He was governor of Rhode Island in 1650-52.

EAST ORANGE, a pleasant village of Essex county, N. J., located 12 miles from New York city. It contains the handsome villas of many New York business men. Pop. (1890), 13,161.

EASTPORT, a port of entry of Washington county, Maine, situated on Moose Island, one of the small islands of Passamaquoddy Bay, which receives the St. Croix, the international boundary between the United States and British America. The harbor of Eastport is deep enough for the largest vessels, and the tide rises within it to a height of 25 feet. The place is largely engaged in the fisheries and in ship-building. Population, 3,736.

EAST PORTLAND, a rapidly growing city of Oregon, near the northern boundary of the State, located in Multnomah county, on the east bank of the Willamette River, opposite Portland, in 45° 30' north lat., and 122° 27' 30" west long. It is 12 miles from the confluence of the Willamette and Columbia Rivers, about 120 miles from the ocean, and at the extreme head of navigation for deep-sea vessels of both rivers. It is connected with Portland by two bridges and three ferry lines, and is practically a portion of Portland proper—so much so, in fact, that a movement is at present under way to in-

corporate the two cities into one. Population, 1870, 830; 1880, 2,934; 1890, 10,481.

EAST RIVER, the strait between New York Harbor and Long Island Sound. It is 20 miles long, separating New York city on the west from its suburbs, Williamsburg and Brooklyn, on the east. Its narrowest part is the Hurlgate or Hellgate, which is about the middle of its course. Here the rocks which once obstructed the passage have been removed by blasting. The name—clearly a misnomer for an arm of the sea—is convenient as contrasted with the North River, or Hudson, and may have arisen from the river-like action of the tides—an action so powerful as to have here and there materially deepened the channel.

EAST ST. LOUIS, a city of St. Clair county, Ill., located on the Mississippi River, opposite St. Louis, Mo. A steel bridge across the Mississippi connects the two cities. East St. Louis is an important railroad center, no less than ten railways either passing through or terminating in the city. The largest stockyards in the United States, those of the National Stock Yards' Company, are located here. They comprise 650 acres. The city contains extensive car shops, foundries, rolling-mills, nail factories, gas works, soda factory, breweries, etc. The Howe Literary Institute (Baptist) is located here. There is also a high school, several graded public schools, an academy (Roman Catholic), and a public library, containing 5,000 volumes. Population in 1880, 9,185; in 1890, 15,156.

EATON, the county-seat of Preble county, Ohio, situated on Seven-Mile Creek, 53 miles north of Cincinnati. Pop. (1890), 2,934.

EATON, DANIEL CADY, an American botanist, born in 1834. He became professor of botany in Yale College in 1864. He has published works on botany and many other scientific papers.

EATON, DORMAN B., a prominent New York lawyer. He was born in Vermont, June 27, 1823, and graduated at Harvard Law School in 1850. In 1874 he served on the Civil Service Commission, and from 1883 to 1886 he was again one of its most sedulous and active members. He has contributed extensively to current literature, and is the author of several works on civil service reform.

EATON, WILLIAM (1764-1811), an American soldier. At the age of 16 he entered the Revolutionary army, but left in 1783 after becoming sergeant. In 1791 he became clerk of the Vermont house of delegates, and in 1797 was appointed consul to Tunis. He returned to the United States in 1803; was appointed naval agent to the Barbary States, and accompanied the American fleet to the Mediterranean in 1804. He organized a band of troops, which he led across the desert against Derne, capital of a province of Tripoli, and, with the assistance of the American fleet, captured the place, which he held with great bravery. He was about to attack Tripoli when operations were suspended by a treaty of peace between the United States and Tripoli. On his return to America, Massachusetts gave him 10,000 acres of land as a reward for his gallant conduct.

EATON RAPIDS, a city of Eaton county, Mich., on Grand River, 24 miles northwest of Jackson. It is a railroad junction, and is noted for its mineral magnetic springs. Pop. (1890), 1,970.

EATONTON, a city and the county-seat of Putnam county, Ga., 21 miles northwest of Milledgeville. Pop. (1890), 1,682.

EAU CLAIRE, a city of Wisconsin, and county-seat of Eau Claire county, situated at the head of steamboat navigation on the Chippewa River, and at the mouth of the Eau Claire River. It is the center of important lumber interests, and has ex-

cellent railroad facilities. The two rivers divide the city into three sections. The public buildings are the court-house and city hall. The streets are well paved and lighted with gas and electricity. The industrial establishments include saw-mills, flouring-mills, grain elevators, iron foundries, paper-mills, machine shops, etc. Lumber is the principal article of export. Population in 1880, 10,119; in 1890, 17,438.

EAU CREOLE, a fine liqueur, made in Martinique, by distilling the flowers of the Mammee apple (*Mammea Americana*) with spirit of wine.

EAU DE JAVELLE, a bleaching fluid and antiseptic, containing salt, potassium hypochlorite and potassium carbonate.

Eaux Bonnes, a watering-place of France, in the department of Basses-Pyrenees, situated 20 miles south-southeast of Oloron. It stands in a narrow gorge surrounded by rocks, and is much frequented on account of its hot sulphurous springs, which are four in number, and are used for bathing purposes. Their temperature does not exceed 91° F.

Eaux Chaudes, Les, three miles southwest of Eaux Bonnes, and a similar place of resort. The springs of both places have the same properties. See *Britannica*, Vol. XX, p. 127.

Eaves: in architecture, the edge of a sloping roof which overhangs the wall for the purpose of throwing off the water.

EAVESDROP, or **EAVESDROP** (Ang.-Sax., *yfes-drype*). "The owner of a private estate," says Kemble (*Saxons in England*, *Britannica*, Vol. I, p. 45), "was not allowed to build or cultivate to the extremity of his own possession, but must leave a space for eaves. The name for this custom was *yfesdrype*." The space was regulated by the charter by which the property was held. This Saxon custom corresponded to the well-known urban servitude of the Romans, called *stillicide* (*stillicidium*). Similar regulations existed in Greece, and have probably existed in all countries.

EAVES-DROPPERS "are such as listen under walls or windows, or the eaves of houses, to hearken after discourse, and thereupon to frame slanderous or mischievous tales." Blackstone's *Comm.*, IV, 168. Such persons are regarded as common nuisances. They may be indicted, and, on conviction, are punishable by fine.

EBEL, JOHANNES WILHELM (1784-1861), a German clergyman. He taught for a while in the gymnasium at Königsberg; in 1807 became pastor at Hermsdorf; in 1810 returned to Königsberg as professor in Friedrich College, and six years later was made preacher in the Old Town church there. He wrote many works on religious topics.

EBELING, CHRISTOPH DANIEL (1741-1817), a German geographer. In 1769 he became a teacher in the commercial school in Hamburg, and in 1784 became professor of Greek and history in the gymnasium in that city. He contributed extensively to various periodicals, and published several works on history and geography. He possessed a wide reputation for his knowledge of the geography of America.

EBENACEÆ, a natural order of exogenous plants, consisting of trees and shrubs, with alternate leathery leaves and axillary flowers, which are mono-petalous, somewhat leathery, and generally unisexual, the fruit fleshy. About 160 species are known, mostly tropical, but a few are natives of temperate countries. The wood is in general remarkable for its hardness, as the different kinds of ebony and other species of *Diospyros*; and on account of this quality, even that of species which never attain the ordinary size of timber trees is sometimes accounted valuable.

EBERLE, JOHN (1787-1838), an American physician. He was professor of physics in Jefferson Medical College in 1825 and in 1830 became professor of materia medica. He accepted a similar position the following year in the Medical College of Ohio, and subsequently became professor of medicine at Transylvania University, Kentucky. He was a prolific author on medicine and other scientific subjects.

EBERS, GEORG, a distinguished orientalist and novelist, was born at Berlin, March 1, 1837. At the universities of Göttingen and Berlin he made Egyptology his central study, and later he visited the principal museums of Egyptian antiquities in Europe. In 1870 he was called to Leipzig as professor, at which university he has since remained. He was the discoverer of the Papyrus *E*, during his sojourn in Egypt, in 1872-73, a very important document on account of the insight it gives into the language and culture of the ancient Egyptians. In 1876 he was stricken with paralysis and at once occupied himself with imaginative composition, as a relief from ennui, the state of his health precluding him from indulging in more serious studies. Of his novels, *Uarda, a Romance of Ancient Egypt*, written in 1877, is the most popular. It was followed by *Homo Sum* in 1878, *The Sisters* in 1880, and *The Emperor* in 1881. *The Burgomaster's Wife* and *Serapis* are his latest works of fiction. All his work on Egypt affords evidence of the most profound scientific study.

EBERNBURG, a small town in the Bavarian Palatinate, situated about 20 miles southwest of Mayence, at the junction of the Alsenz with the Nahe.

EBERT, KARL EGON, Bohemian poet, born at Prague, June 5, 1801; educated there and at Vienna, and after filling several situations finally settled in Prague. His chief works are his *Dichtungen* (poems), 2 vols., 1824; *Wlasta, ein Böhmisch-nationales Heldengedicht in drei Büchern* (Wlasta, a Bohemian national heroic poem, in three books), 1829; and *Das Kloster, idyllische Erzählung in fünf Gesängen* (The Cloister, a Narrative Idyl, in five cantos), 1833.

EBERARD, JOHANN HEINRICH AUGUST, a German theologian, born at Erlangen, Bavaria, Jan. 18, 1818, educated at the gymnasium of his native town, and afterwards studied theology at the university there and at Berlin. In 1844 he was called to the professorship of theology at Zurich, Switzerland; returned to Erlangen in 1847, and was made professor of Reformed theology, and in 1853 became counselor in the Royal Consistory of the Evangelical church of the Palatinate at Spire, where he remained until 1861. On his return to Erlangen he devoted himself to literature; in 1875 became pastor of the French colony there, and since 1876 has been president of the reformed synod of eastern Bavaria. He is author of many theological works, several dramas, and a number of short moral and religious stories; has translated Ossian's *Fingal* into German, and prepared a grammar and dictionary of the mediæval Gaelic language.

ECCE HOMO (Lat., "Behold the Man"), the name usually given by artists to paintings representing Christ bound and crowned with thorns previous to his being led forth to crucifixion. The finest *Ecce Homo* is that of Correggio in the National Gallery, London, the whole conception of this remarkable picture being of the finest order of genius.

ECCENTRIC: in machinery, a contrivance for taking an alternating rectilinear motion from a revolving shaft. It consists of a circular disc or pulley, fixed on a shaft or axis which does not pass

through the center of the disc. The eccentric is chiefly used where a subsidiary motion of small power is required; as for working the force-pump that supplies the boiler of a steam-engine.

ECCENTRICITY, a mathematical term which, in the older mathematical works, is used as the name of half the distance between the foci of an ellipse or hyperbola. More properly, the eccentricity is the ratio of half the distance between the foci to the semi-major axis.

ECCHYMOSES, a discoloration of the surface, produced by blood effused below or in the texture of the skin. It is usually attended by swelling to a greater or less extent, and is the result of injury.

ECCLSFIELD, a township in the West Riding of Yorkshire, England, five miles north of Sheffield. The chief manufacture is cutlery, but flax, linen, and nails are also branches of industry. There are coal and iron mines in the vicinity.

ECCLSIASTES. See *Britannica*, Vol. VII, pp. 623-28; also Vol. III, p. 639.

ECCLSIASTICAL CORPORATION. The holder of an ecclesiastical benefice is, by law of England, regarded as a corporation. Ecclesiastical corporations are divided into aggregate and sole. The former consist of several persons, as the head and fellows of a college, the dean and chapter of a cathedral, and are kept up by a continual succession of members. An ecclesiastical corporation sole consists of a single person and his successors in the benefice, as a bishop, a rector, a parson, or a vicar. The object of the common law, in thus regarding the incumbent of the benefice as a corporation sole, is to preserve the temporalities which are vested in him, and which would otherwise descend to his right heirs.

ECCLSIASTICAL COURTS, courts specially devoted to the consideration of matters relating to the clergy and religion. In England and Scotland they also have peculiar jurisdiction over questions of tithes, and matrimonial and testamentary causes. These courts were first instituted at the time of the Norman Conquest, and have continued with various modifications down to the present day.

ECCLSIASTICAL TITLES ASSUMPTION ACT, the title of an act of the English Parliament (14 and 15 Vict., c. 49) passed to prohibit the assumption of the title of archbishop, bishop, or dean, by any person in England or Ireland, claiming the right to such title by virtue of an appointment by the Pope, or papal authorities. A penalty of £100 was provided for a violation of the act. By 34 and 35 Vict., c. 50, the Ecclesiastical Titles Assumption act was repealed.

ECCLSIOLOGY, the name which has been given in the British Islands to the study of church architecture and decoration. It has a literature of its own, including a monthly journal, called "The Ecclesiologist." There are societies for promoting its study, one of which, "The Ecclesiological late Cambridge Camden Society," has published *A Handbook of English Ecclesiology* (Lond., 1847).

ECCLISON, SAMUEL (1801-51), an American Roman Catholic archbishop. He was ordained in 1825, and later studied in Paris. On his return he became first vice-president, then president of St. Mary's College. In 1834 he became archbishop of Baltimore.

ÉCHELON, such a formation or arrangement of troops that, if viewed from a height, they would present some analogy to the successive steps of a ladder or staircase. The several divisions of the force, although parallel, are no two on the same alignment. Each has its front clear of that in advance, so that, by marching directly forward, it can form line with it. The word *échelon* is also used in

reference to nautical maneuvers. A fleet is said to be arranged *en échelon* when it presents a wedge-form towards the enemy.

ECHIMYD (*Echimy*s), a genus of rodent quadrupeds, in some of their characters agreeing with dormice, but differing from them in having the tail scaly, and the fur coarse and mingled with flattened spines. They are all South American.

ECHINOCACTUS, a genus of plants of the cactus family, comprising more than two hundred species, most of which belong to Mexico and the United States. They bear large, showy flowers, and are armed with clusters of short spines.

ECHIUM, a genus of boraginaceous plants, of which there are about fifty species, represented by the common blueweed or viper's bugloss.

ECHO: in music, the repetition of a melodic phrase, frequently written for the organ, on account of the facility with which it can be produced by the stops.

ECHO CAÑON, a remarkable ravine in the midst of magnificent scenery, in Summit county, Utah Territory, 975 miles from Omaha.

ECKARDT, JULIUS, a German writer, born in 1836. In 1860 he settled in Riga as a consulting advocate, and later became secretary of the provincial consistory of Livonia. For a time he edited the "Rigasche Zeitung," the organ of the German party in the Baltic provinces, and in 1867 went to Germany, where he edited various journals. In 1870 he was made secretary of the Senate of Hamburg, and in 1882 became connected with the Prussian state service. He is the author of numerous works on the Baltic provinces.

ECKERT, THOMAS THOMPSON, an American telegrapher, born in 1825. He was connected with various telegraph lines until the beginning of the civil war, when he took charge of the military telegraph office at the headquarters of Gen. McClellan. In September, 1862, he established the military telegraph headquarters in the War Department building at Washington. In 1864 he was brevetted brigadier-general, and then appointed Assistant Secretary of War, retaining the office until 1866, when he resigned. He has since been connected with various telegraph companies, and in 1881 became vice-president and general manager of the Western Union Telegraph Company. In March, 1893, he became president of that institution.

ECKFORD, HENRY, naval architect, born in Scotland, March 12, 1775, died in Constantinople, Turkey, November 12, 1832. During the war of 1812 he was employed by the United States Government to construct vessels-of-war for the lakes and inland waters. Later he built the steamer *Robert Fulton*, which eventually was purchased by the Brazilians. In 1820 Mr. Eckford became United States naval constructor at the Brooklyn navy yard. Under his direction the government built six ships of the line. In 1831 he built a sloop-of-war for the Turkish navy, and was preparing to enter the service of that government as chief naval constructor when he died.

ÉCOLE POLYTECHNIQUE, one of the most celebrated military academies of France. It was established in Paris in 1794, at the Palais de Bourbon, for the purpose of educating young men for military, naval and civil engineering. In 1804 Napoleon made the organization of the school more strictly military, to identify it more fully with the army. Candidates are only admitted after competitive examination. To be eligible the youth must be French, and between sixteen and twenty years of age; although soldiers who have served two years in the regular army are admissible up to the age of twenty-five. The course of instruction lasts two

years, when graduates have the privilege of choosing from among the various public services supplied from this school, the particular branch they wish to enter. The school was reorganized in 1852, under the title of *Ecole Impériale Polytechnique*.

ECONOMY, a Socialist village of Pennsylvania, on the right bank of the Ohio, about 17 miles from Pittsburgh. The settlement was planted in 1825 by immigrants from Germany. The inhabitants own everything in common—3,500 acres of land, upwards of 100 houses, with a church, a school, a museum, and manufactories of wool, cotton, and silk.

ÉCORCHÉ, a figure in which the muscles are represented, stripped of the skin, for purposes of artistic study. From a portion of the figure, the upper muscles are also removed, so as to exhibit those which lie nearer to the bone.

ÉCOUTES, in military operations, connected with siege works, are listening places. They are small galleries, excavated at regular distances, and going out beneath and beyond the glacis, towards the lines and batteries of the besiegers. Their purpose is to enable the garrison to hear and estimate the works being carried on by the sappers and miners of the enemy.

ECTROPION, an everted condition of an eyelid, in consequence of which it does not cover the globe of the eye. It is capable of being remedied by a slight surgical operation.

ECTROTIC, a term applied to methods of treatment which aim at preventing the development of a disease.

ECTYPOGRAPHY, a method of etching, in which the lines are raised on the plate, in place of being sunk into it.

ECTYPUM, a cast in relief of an ornamental design, produced from a mold.

ECUADOR (*Republica del Ecuador*). For its location, history, topography, climate, productions, political and social condition, and earlier statistics, see *Britannica*, Vol. VII, pp. 644–649. According to the latest official statistics the area of the Republic is 120,000 square miles, divided into 16 provinces, and one territory with a population of 1,220,000; 100,000 whites, 300,000 mixed, and 800,000 Indians, besides an unknown number of uncivilized Indians. The capital, Quito, has a population of 50,000. Other chief cities are Guayaquil, with a population of 40,000; Cuenca, 30,000; Riobamba, 18,000; and Latacunga, 10,000. The religion of the Republic, according to the constitution, is Roman Catholic, to the exclusion of every other. Primary education is gratuitous and obligatory. There is a university at Quito, and university bodies in Cuenca and Guayaquil. There are 37 secondary schools, and 856 primary schools, with about 60,000 pupils. There are also a military school, commercial schools, and technical schools.

The revenue of the Republic for 1889–90 was 4,252,522 sucres, and the expenditures for the same period 4,429,246 sucres. The public debt is \$18,523,400. More than one-half the revenue is derived from customs duties on imports at the port of Guayaquil, the amount received from this source during 1889 being 2,477,543 sucres. Although the national convention of 1884 determined that the standing army should consist of but 1,600 men, the official statement for 1889 places the number actually in service at 3,000. The national guard consists of 30,000 men.

The exports from Ecuador in 1889 amounted to 12,000,000 sucres, of which the chief articles were: cocoa, valued at 5,400,000 sucres; India-rubber, 189,000 sucres; hides, 195,000 sucres; coffee, 590,000 sucres; vegetable ivory, 210,000 sucres; precious metals,

810,000 sucres. There are no trustworthy statistics of imports. The foreign commerce is chiefly with Great Britain.

The roads of the country are mostly bridle-roads, although a few cart-roads have been established in the interior. Only one railway is in course of construction, running from Duran (opposite Guayaquil) to Chimbo, a distance of about 50 miles. The total length of telegraphs is about 1,200 miles.

EDBROOK, WILLUGHBY J., an American architect, born in 1843. In 1860 he became an apprentice to his father, a contractor and builder, and devoted himself to the study of architecture. The following year he went into business for himself, and soon became prominent as an architect. He was city commissioner of buildings of Chicago, Ill., and on April 13, 1891, became Supervising Architect of the United States Treasury.

EDDY, THOMAS (1758–1827), an American philanthropist. In 1779 he settled in New York and became a merchant, but failed in 1784. In 1790 he entered the insurance business and soon made a large fortune. He was active in the establishment of a penitentiary system, and was director of the first building for four years. He became a governor of the New York hospital in 1793, and in 1815 was one of the founders of the Bloomingdale Insane Asylum. He labored for the construction of the Erie Canal, and was one of the originators of the New York Savings Bank, and also of the New York Bible Society. He wrote a work on the *State Prison of New York*.

EDDYSTONE, a group of gneiss rocks, daily submerged by the tide in the English Channel, nine miles off the Cornish coast, and 14 miles south-south-west of Plymouth breakwater. The rocks lie in latitude 50° 10' 54" N., and longitude 4° 15' 53" E., and have 12 to 150 fathoms water around. These rocks are the site of the light-house which bears their name.

EDEN, a river rising in the east of Westmoreland, in the Pennine Chain. It runs north-north-west through the east of Westmoreland and Cumberland, past Appleby and Carlisle, and ends in a fine estuary at the upper part of the Solway Firth, after a course of 65 miles.

EDENTON, a county-seat of Chowan county, N. C., and a port of entry on Edenton Bay, which opens into Albemarle Sound. Pop., 2,205.

EDGARTOWN, a port of entry and county-seat of Dukes county, Mass. It is on Martha's Vineyard, and has a small safe harbor. Pop., 1,156.

EDGE CUMBE. 1. A bay in the coast of Australia, lies within the province of Queensland, near latitude 20° S. and longitude 148° E. It is sheltered on every side but the north, its east barrier terminating in Cape Gloucester. 2. A mountain in Alaska marks the northwest point at the mouth of Norfolk Sound which connects the metropolitan settlement of New Archangel on the island of Sitka with the open ocean. It rises from the water's edge an almost perfect cone, which during nearly the whole year is capped with snow.

EDGEHILL, an elevation near the village of Keinton, Warwickshire, Eng., where the first great battle of the civil war was fought on Sunday, Oct. 23, 1642, between the Royalist forces under Charles and the Parliamentarians under the Earl of Essex. The Royalists were defeated, and after the battle 4,000 men lay slain at the foot of Edgehill, most of whom were Royalists.

EDGERTON, a city of Rock county, Wis., 25 miles southeast of Madison. Pop., 1,595.

EDGINGS, a name given by gardeners to the borderings of walks in gardens and lawns. They are sometimes made of stone and not infrequently of

wire-work; but for many purposes the best edgings are formed of low growing plants.

EDINBOROUGH, a village of Erie county, Pa., containing a State normal school.

EDINBURGH, a village of Johnson county, Ind., on Blue River. It has good water-power, hominy-mills, and a starch factory.

EDINBURGH, a small village of Grundy county, Mo. It contains Grand River College.

EDINBURGH, ALFRED ERNEST ALBERT, DUKE OF, second son of Queen Victoria, born at Windsor Castle in 1844, and entered the navy in 1858. The crown of Greece was offered to him in 1862, but he declined it. In 1866 he entered the House of Lords as first Duke of Edinburgh. In 1867 he visited Australasia, India, China and Japan. In 1868 he was wounded by O'Farrell, a Fenian, who was subsequently executed. In 1874 he married Marie Alexandrovna, daughter of the Czar Alexander II. In 1886 he was appointed admiral in command of the Mediterranean squadron, with which, in 1888, he visited some of the chief continental capitals. He received, in the latter year, the honorary rank of general of infantry in the German army, and was invested by the queen-regent of Spain with the order of the Golden Fleece.

EDINBURGH (DUCHESS OF), MARIE ALEXANDROVNA, Grand Duchess of Russia, only daughter of the late Emperor of Russia, and sister of the present emperor, was born at St. Petersburg, Oct. 17, 1853, and married there to Prince Alfred, Duke of Edinburgh. On Oct. 15, 1874, she gave birth, at Buckingham Palace, to a son, who was baptized by the name of Alfred Alexander William Ernest Albert. The Duchess of Edinburgh's other children are the Princess Marie Alexandra Victoria, born Oct. 29, 1875; the Princess Victoria Melita, born at Malta, Nov. 25, 1876; the Princess Alexandra Louis Olga Victoria, born at Cobourg, Sept. 1, 1878, and the Princess Beatrice Leopoldine Victoria, born April 20, 1884. English people have dubbed her "The Little Russian Bear."

EDISON, THOMAS ALVA, an American inventor, born in Alva, Ohio, Feb. 11, 1847. At the age of 12 he became a newsboy on the Grand Trunk line, and later printed the "Grand Trunk Herald," which he sold with his other papers. Subsequently a station-master taught him telegraph operating. His first invention was an automatic repeater, by which a message could be transferred from one wire to another without the aid of an operator. In 1864 he conceived his duplex telegraph, and in 1872 this system was successful. In 1871 he invented the printing telegraph for gold and stock quotations. Among his later inventions are his system of duplex telegraphy developed into quadruplex and sextuplex transmission; the carbon telephone transmitter, the microtasmeter; the aëraphone; the megaphone; the phonograph, and the phonometer. His attention has been given for some time to the development of electric lighting, and he perfected the incandescent lamp. He also solved the problem of the general distribution of electricity, like gas, and his system is now in general use. In 1878 Union gave him the degree of Ph. D., and the same year the French government made him a Chevalier of the Legion of Honor.

EDISTO, a river of South Carolina. It flows through the southwest part of the State, being formed near Branchville of the North Edisto and the South Edisto, and entering the Atlantic by two arms respectively named from the two confluents. Edisto also designates the island which separates those two arms. The stream is navigable for 100 miles upwards, and its mouth is about 20 miles to the southwest of Charleston.

EDMONDS, FRANCIS W. (1806-63), an American artist. He was a bank cashier in Hudson and New York until 1855, studying in the mean time at the National Academy of Design. He was elected an associate in 1838, then a trustee, and in 1840 he became an academician. He studied in Europe and later was instrumental in the establishment of the New York gallery of fine arts. Among his productions are: *Barnyard*, *Sewing Girl*, *The City and Country Beauts*, *The Penny Paper*, *Vesuvius and Florence*, and *The Sleepy Student*.

EDMONDS, JOHN WORTH (1799-1874), an American jurist. He began the practice of law in Hudson, N. Y., in 1820, and later became State recorder. In 1831 he was a member of the State assembly and in 1832-36 of the State Senate. In 1836-38 he was on a special mission among the Indians for the Government, and on his return resumed the practice of law. In 1843 he became one of the State-prison inspectors, and subsequently was instrumental in many important reforms in prison discipline. He was made a circuit court judge in 1845, a judge of the State Supreme Court in 1847, and judge of the court of appeals in 1852. He was converted to the doctrines of spiritualism in 1851, and later published books on this subject as well as on law.

EDMONSTONE ISLAND, an outpost, as it were, of the delta of the Ganges toward the Bay of Bengal, situated at the mouth of the Hoogly, the most westerly arm of the great river above mentioned, in latitude 21° 32' N., and longitude 88° 20' E.

EDMONTON, a large village in the northeast of Middlesex, near the Ken, seven miles north-northeast of London. Population of parish (1871), 13,859. It contains many villas of London merchants, etc. Charles Lamb is buried in the churchyard here. Edmonton is connected with Cowper's humorous poem of *John Gilpin*.

EDMORE, a railroad junction and shipping point in Montcalm county, Mich., 33 miles north of Ionia.

EDMUNDS, GEORGE FRANKLIN, an American statesman, born in 1828. He received a public school education and the instruction of a private tutor; studied and practiced law; was a member of the Vermont legislature in 1854, '55, '57, '58 and '59, serving three years as speaker; was a member of the State Senate, and its presiding officer *pro tempore* in 1861-62; was appointed to the United States Senate as a Republican to fill the vacancy caused by the death of Solomon Foot, and took his seat April 5, 1866; was elected by the legislature for the remainder of the term ending March 4, 1869, and has since been successively reelected four times. He was a member of the Electoral Commission of 1877. His term would have expired March 3, 1893; but in consequence of impaired health he tendered his resignation as Senator in April, 1891, to take effect Nov. 1, ensuing.

EDMUND'S (ST.) HALL, Oxford, derives its name from St. Edmund, archbishop of Canterbury in the reign of Henry III. As early as 1269, it appears to have been purchased by the canons of Osney, and devoted to purposes of education. On the dissolution of religious houses under Henry VIII, it fell into the hands of two citizens of Oxford, who sold it to William Denyse, provost of Queen's College. The provost devised it to his college, and that society accordingly now nominates the principal of St. Edmund's Hall.

EDUCATION, SECONDARY, or that which intervenes between the primary and the higher, is in America afforded by grammar and high schools, or by academies. The primary design of these institutions is to fit students to enter upon col-

legiate studies, and thus relieve well-equipped colleges from the incumbrance of fitting-schools. In addition to high schools and academies there are many private institutions that afford secondary education, and many of the colleges have found it necessary to establish preparatory departments.

EDWARDS, AMELIA BLANDFORD, an English writer of fiction and Egyptologist, born in 1831. She early became proficient in music, and was inclined to embrace that art, but being drawn into literature she soon became known to the world by her novels. *Barbara's History* was published in 1864. *Lord Brackenbury*, which appeared in 1873, has been five times translated. Her books of travel have also attained great popularity. Of these, *Untrodden Peaks and Unfrequented Valleys* was published in 1873, and was followed in 1877 by *A Thousand Miles Up the Nile*. As an archaeologist she has written many valuable articles for leading reviews and magazines. It was largely due to her exertions that the Egyptian exploration fund was founded in 1883. During the winter of 1889-90 she lectured in the United States. Columbia College has conferred upon her the honorary degree of L. H. D. Miss Edwards died April 15, 1892. She founded a chair of Egyptology at Oxford, being devoted to that study.

EDWARDS, BELA BATES (1802-1852), an American clergyman. He was licensed to preach in 1830. From 1828 to 1833 he was assistant secretary of the American Education Society. He was made professor of Hebrew in Andover Theological Seminary in 1837, and in 1848 was elected associate professor of sacred literature. In 1828-42 he was editor of the "American Quarterly Register;" in 1833-35 of the "American Quarterly Observer;" in 1835-38 of the "American Biblical Repository," and in 1844-52 of the "Bibliotheca Sacra." He wrote several works on miscellaneous subjects.

EDWARDS, JONATHAN, JR. (1745-1801), an American theologian. He received a license to preach in 1766; was a tutor at Princeton College from 1767 to 1769, when he became pastor of the society in White Haven, Conn.; was made pastor of the church at Colebrook in 1796, and in 1799 became president of Union College. He wrote many important works on theological subjects.

EDWARDS, JUSTIN (1787-1853), an American clergyman. He was ordained in 1812; became a member of the executive committee of the New England Tract Society, and in 1821 became corresponding secretary. He was prominent in the organization in Boston of the "American Society for the Promotion of Temperance," in 1825. He was for a while pastor of a new church in Boston, but resigned in 1830 to devote the next six years to the cause of temperance. From 1836 to 1842 he was president of the Andover Theological Seminary, when he became secretary of the American and Foreign Sabbath Union. The last few years of his life were spent in writing on religious topics.

EDWARDS, MATILDA BARBARA BETHAM, an English novelist, born at Westerfield, Suffolk, in 1836. She began to write at an early age, and has published *The White House by the Sea*; *Doctor Jacob*; *Kitty*; *A Winter with the Swallows in Algeria*; *A Year in Western France*, and *Mrs. Punch's Letters*.

EDWARDS, NINTAN (1775-1833), a United States Senator. He was admitted to the bar in Kentucky in 1798, and in Tennessee the following year. He was appointed judge of the general court of Kentucky, judge of the circuit court in 1803, of the court of appeals in 1806, and chief justice of the state two years later. From 1809 to 1818 he was governor of the Territory of Illinois, and from 1818 till 1824 was a United States senator from the State

of Illinois. From 1826 to 1830 he was again governor of Illinois.

EDWARDS, OLIVER, American soldier, born in Springfield, Massachusetts, in 1835, entered the Northern army at the beginning of the civil war, and rose, gaining almost every step by acts of personal gallantry, to the rank of brigadier-general in 1865. His services were most conspicuous during the second day of the battle of the Wilderness; at Spotsylvania (1864), where he held the "bloody angle" for eleven hours with his own brigade, and, at the head of twenty regiments, faced the enemy for thirteen hours thereafter; and at Sailor's Creek, where he captured Generals Custis Lee and Ewell. General Edwards, after the war, returned to mercantile pursuits.

EDWARDSVILLE, the county-seat of Madison county, Ill., on the Cahokia Creek, 19 miles northeast of St. Louis, Mo. It has two railroads, two newspapers, manufactories of plumbers' supplies, bricks, carriages and wagons. Its population in 1890 was 3,561.

EELS in paste, vinegar, etc., are animalcules (*Infusoria*) of the family *Vibrionidae*. When at rest they appear like very minute hairs, or bits of very fine thread. Some of them wind themselves about in a spiral form when they move. The species are numerous, and they occur in almost all vegetable substances beginning to undergo decay, which they hasten. See *Britannica*, Vol. IX, p. 98, note.

EFFARE, or EFFRAYÉ, in heraldry, signifies that the animal to which it refers is to be represented as rearing on its hind-legs, as if it were frightened or enraged.

EFFECT, the general impression produced on the mind by the first sight of a picture or other work of art, or the impression which it produces when seen from so great a distance as to render the details invisible. The term has reference both to design and coloring, which, if correctly indicated, may be judged of with perfect confidence before either has been completed in detail.

EFFENDI, a title of honor among the Turks, bestowed upon civil dignitaries and persons of various ranks, in contradistinction to the title of Aga, borne by courtiers and military men.

EFFERVESCENCE. Nearly all gases are more or less soluble in water, the amount of solubility depending on various conditions of pressure and temperature. The lower the temperature and the greater the pressure, the greater the solubility of a gas, so that when the temperature of such a solution is raised, or the pressure lowered, the gas escapes in small bubbles, giving rise to the phenomenon effervescence.

EFFINGHAM, a city and county-seat of Effingham county, Ill., 199 miles southwest of Chicago. It is engaged in the manufacture of brick.

EFFLORESCENCE, a term applied to the appearance of a white incrustation on the walls of buildings, or when a salt loses its water of crystallization, and presents a white powdery appearance on the surface. Common washing-soda exposed to the air affords a good illustration of this phenomenon.

EFT, a term of Anglo-Saxon origin, applied both to lizards and newts, which, notwithstanding the important differences between them, were until recently confounded even by naturalists. In works of natural history, the term eft is now used as synonymous with newt.

EGAN, PIERCE (1772-1849), the author of many works, including *Boziana* and *Life in London*. His son Pierce Egan, the younger (1814-80), wrote many novels for "Reynolds' Miscellany" and the "London Journal."

EGERIA, the name of the Nymph or Camena, from whom, according to the legend, King Numa received the ritual of public worship which he established in Rome. The grove where Numa met the goddess to receive her instructions was dedicated by him to the Camenæ.

EGG, or EGG, an island 12 miles off the west coast of Inverness-shire, and eight miles southwest of the south point of Skye. It is $4\frac{1}{2}$ miles long by $2\frac{1}{2}$ broad. It consists chiefly of trap, which in the north alternates with sandstone and limestone, the latter rocks containing oolitic fossils, carbonized wood and coal.

EGGA, a large town of the Soudan, Africa, Yaruba country, situated on the right bank of the N'iger, in latitude $8^{\circ} 43'$ north, longitude $6^{\circ} 20'$ east. Its streets are narrow; the houses are principally huts, built of clay, the walls smooth, and stained with indigo. Great quantities of narrow cotton cloth, generally dyed blue, are manufactured here. The population is partly Mohammedan and partly Pagan. See Britannica, Vol. XXII, p. 279.

EGGAR MOTH, the name of certain species of moth, of the genus *Lasiocampa*, allied to the silk-worm moth (see Britannica, Vol. IV, plate XXX. Fig. 26). One species (*L. trifolii*), of a uniform foxy ochreous color, with wings expanding about two inches, produces a caterpillar as thick as a swan's quill, hairy and ochreous brown.

EGG-BIRD (*Hydrochelidon fuliginosum*, or *Sterna fuliginosa*), a bird of the gull family, sometimes called the SOOTY TERN (see TERN in Britannica, Vol. XXIII, p. 189). It is larger than the common tern of the British shores; has a long, slender, nearly straight, compressed, sharp bill; very long, narrow, and pointed wings, and a long, deeply forked tail; the general color is glossy black on the upper parts, except the forehead and the edges of the wings, which, with the under parts, are white. It abounds in the West Indian seas. The nest of the egg-bird is merely a little excavation in the sand, and usually contains three eggs, which are fully two inches long, of a pale-cream color, sparingly marked with light brown and purple tints. The eggs are esteemed delicious, and form an object of profitable adventure in the months of March, April and May, to the crews of numerous small vessels, fitted out from Kingston, Havana, and other West Indian ports.

EGGLESTON, EDWARD, an American author, born in 1837. He became a Methodist preacher in 1856, and later held pastorates at St. Peter's, St. Paul, Stillwater and Winona. In 1866 he was associate editor of the "Little Corporal," a children's paper, published in Evanston, Ill.; in 1867-70 was editor of the Chicago "Sunday-School Teacher;" in 1870-71 was editor of the "New York Independent," and in 1871-72 was editor of "Hearth and Home." From 1874 to 1879 he was pastor of the Church of Christian Endeavor, in Brooklyn. His novels depicted early life in Indiana, and have been widely read.

EGG-PLANT (*Solanum melongena*), an annual usually less than two feet high, with stem partially woody; fruit resembling an egg in shape only, being purple, and attaining very large dimensions under good culture in a proper climate, as that of New Jersey. The fruit is much used as a food, not only in the tropical countries of which the plant is a native, but in warm countries generally, into which it has been introduced.

EGHAM, a village of Surrey, England, on the right bank of the Thames, eight miles south-southeast of Windsor and 21 west of London. In the vicinity are Runnymede, Cooper's Hill and the Royal Holloway College for Women, opened by the Queen in 1886. Population of parish, 9,000.

EGILSSON, SVEINBJÖRN (1791-1852), an Icelandic antiquarian and lexicographer. In 1819 he became assistant in the Latin school at Bassastadir, and in 1846 was called to the rectorate at Reikjavik. He gained his reputation through his dictionary of the words used in the Old Norse poetry, his Latin translation of the sagas of the Norse kings, and his Icelandic translation of Homer.

EGMONT, PORT, on the northern coast of West Falkland Island, between Saunders and Kappel islands. It has good anchorage and water for vessels, but no provisions can here be obtained.

EGOISM, an ethical term, used in the sense of selfishness; it is especially opposed to altruism. The word is sometimes used to denote a metaphysical system of subjective idealism, in which the ego is the sole reality.

EGREMONT, a market-town of Cumberland, England, on the River Eden, six miles southeast of Whitehaven. It contains mines of iron ore. On an eminence stand the ruins of Egremont Castle, the legend of whose horn forms the subject of a poem by Wordsworth. From 1749 till 1845 Egremont gave the title of Earl to the Wyndham family. Population, 5,976.

EGYPT: For the geography, climate, productions, history and earlier statistics of Egypt, see Britannica, Vol. VII, pp. 700-788. The historical record in Vol. VII ceased in 1877, at which time Ismail I. was the reigning Khedive. Ismail I. was, at the instance of the Western powers, deposed by his suzerain, the Sultan, in June, 1879, and Prince Tewfik, his eldest son, was proclaimed in his stead. The year 1880 saw the passage of the Law of Liquidation, a measure participated in by five European powers for regulating the public debt. The year following witnessed the revolt of Arâbi Pasha. He demanded the expulsion of foreign officials and a cessation of foreign interference and met with a large measure of popular support. He was practically a military dictator, and in 1882 British and French war-ships were dispatched to Alexandria to overawe the rebels, but their appearance was followed in June by rioting and massacres of Europeans in the streets. Meanwhile Arâbi was strengthening the fortifications. The British admiral demanded that the work should be discontinued. Arâbi persisted; the French sailed away in dismay; and the British ships bombarded the fortifications (11th July). On the sudden withdrawal of the Egyptian troops, the city was plundered and partly burned by rioters. Three days elapsed before a force sufficiently strong to cope with the insurgents could be landed. This was at last effected by Sir B. Seymour, who was soon to be reinforced by troops from England and some regiments of sepoys from India. Sir Garnet Wolseley took command of these forces, and crossing the desert attacked and utterly routed the main body of Arâbi's army at Tel-el-Kebir, and occupied Cairo. Arâbi was banished to Ceylon, the authority of the Khedive restored, and measures taken for the reorganization of the country. This labor was entrusted to Sir E. Baring, who has proceeded upon the lines of a constitution drawn up by Lord Dufferin. A conference of the great powers in 1884 did not sanction the British scheme for managing Egyptian finance. The beneficial effects of British rule were greatly marred by the severe visitation of cholera, which swept away no less than 150,000 persons in the summer of 1883, and this was followed in 1884 by a wide-spread rebellion which broke out in the Soudan under the leadership of the Mahdi. This religious fanatic, Mohammed Ahmed, put himself forward as a prophet whose mission was to free Islam from external enemies and re-establish the

pure, primitive faith. An attempt of Rauf, the governor-general, to suppress this propaganda had been resisted with bloodshed in August, 1881, and thenceforward the movement had spread rapidly. In January, 1883, Sennaar revolted, and the Mahdi occupied El-'Obeyd. Hicks Pasha's command, sent against him by the Egyptian government, was annihilated near El-'Obeyd in November, 1883. An Egyptian force, under Consul Moncrieff, was routed with severe loss in the same month near Suakin, and Baker Pasha was twice disastrously defeated at Teb and Tamanieb, early in 1884. In January, 1884, General Charles George Gordon, the leader of the "Victorious Army" against the Tae-ping rebels in China, went to Khartoum as England's representative, at the request of Gladstone's government, to secure the withdrawal of the Egyptian garrisons from the Soudan, Egypt having, on the advice of England, agreed to give up all her possessions in the Soudan except the Red Sea littoral. Notwithstanding it was known that Gordon's negotiations had proved unsuccessful, and that he was practically hemmed in by the Mahdi's followers in Khartoum, indecision marked the course of the English government. The proverbially weak foreign policy of the liberals was evidenced by vacillating behavior and innumerable delays. The colonies of Canada and Australia had patriotically responded to the call for troops from Downing street, and for the first time in history colonial troops stood side by side with British soldiers on an enemy's soil. Gordon, a popular hero already in the eyes of the English nation, became doubly so when the extent of his peril was known. At last, in October, 1884, yielding to the pressure of public opinion, the government dispatched an expedition to Khartoum under Lord Wolseley, who, selecting a difficult and tortuous route up the Nile, arrived before the city only in time to learn of the assassination of Gen. Gordon two days before. The expedition withdrew without attempting to retaliate, and the Soudan, save for a few not very resolute military operations around Suakin, was left to enjoy its anarchy. The news of the heroic Gordon's death was received in England with a grief that was wide-spread. A song, composed in his honor, "Too late, too late to save him," was sung everywhere and public indignation against the government, which had abandoned its representative to a cruel death at the hands of semi-barbarians, ran high. Cabinet ministers were hissed on the open streets and a keen disgrace was felt to have been inflicted upon the honor of the entire nation.

The Mahdi is now dead, and his Calif Abdallah reigns in his place. Sheikh Senousi, of Tripoli, is believed to have obtained possession of much of the Soudan, but beyond this little is known to the outer world.

Tewfik Pasha, the Khedive of Egypt, died Jan. 7, 1892. He was succeeded by his son, Prince Abbas, who ascended the throne Jan. 16, 1892. Since the rebellion in 1882, an English army of occupation has remained in Egypt. Its present strength approximates 4,000 men. Late in 1892 the present Khedive, yielding to French influence, gathered around him a ministry inimical to English interests. A laconic message being sent him by the British representative that his ministers must be dismissed, elicited the prompt reply that the Khedive had already complied. At this writing, however, the rumor is rife that the Khedive is sounding the sheikhs with the view of ascertaining to what extent he may count upon their support and that his intentions are to engage at no distant day in a determined struggle for native Egyptian supremacy.

The public debt of Egypt in 1892, including the

three percent. loan of £9,024,500 guaranteed by the powers, was £106,572,400.

The budget for 1892 shows a revenue of £9,950,000, with an expenditure of £9,400,000. The charges on account of debts of all descriptions in 1892 are estimated at £4,519,637. Exports £11,876,087; imports £8,081,297. Egypt has a railway system of a total length of 1,127 miles; telegraph 3,168 miles, and there is a telephone line between Cairo and Alexandria.

EGYPT EXPLORATION FUND, a society founded in 1883, under the presidency of Sir Erasmus Wilson, for the purpose of historical investigation in Egypt, conducted in a scientific manner, with the object of solving some of the many important questions which await the result of excavation. Special attention has been directed to all that can bear on the history of the sojourn and exodus of the Israelites, and the early sources of Greek art. The work is conducted on the principle of careful examination of all details and preservation of the objects found. These objects are of great interest in illustrating comparative art by the influences of Egyptian, Greek and Syrian styles on one another, the technical processes of metal work, metrology and the ceramic arts. The antiquities found are divided between the National Museum of Egypt, the British Museum, the Boston Museum of Fine Arts, and various local museums in England and the colonies. Annual volumes are published, giving the results of each season's work with maps and plates. In 1890, M. Edouard Naville commenced the exploration of the Heracleopolis under the auspices of the society.

EHNINGEN, a town of Würtemberg, Germany, situated 21 miles S.E. of Stuttgart, is the rendezvous of a great number of peddlers, who traverse the neighboring districts for the purpose of disposing of their wares. Population, about 6,000.

EHNINGER, JOHN WHETON, an American artist, born in 1827. He studied in Europe in 1848-49, and again in 1851-52. Besides drawing in outline, pencil and India ink, he has produced many popular paintings, principally illustrative of New England rural life.

EHRENFELD, a busy town of Prussia, two miles west of Cologne, manufactures glass-ware, railway fittings, chemicals and bricks; it has also flour-mills and machine-shops. Population, 18,243.

EICHWALD, CHARLES EDWARD, a Russian naturalist, born at Mitau, Russia, July 4, 1795, died at St. Petersburg, Nov. 10, 1876. He studied at Berlin and Vienna. In 1840 he made a geological journey through Italy, Sicily, and Algeria. His geognostic, botanical, and zoological researches were unquestionably of more service to Russia than those of any man since Pallas.

EIFFEL TOWER, an immense iron structure designed and built by M. Eiffel, in Paris, France, for use in the great Paris Exposition in 1889. It was the outcome of a series of investigations undertaken by M. Eiffel in 1885 with the view of ascertaining the extreme limits to which the metallic piers of viaducts could be safely pushed, this special line of investigation having reference first to a proposed bridge with piers 400 feet in height, and of 140 feet base. The general plan of the great tower speedily followed, and in its elaboration care was taken to give to the angles of the tower such curves as would best enable it to resist the transverse effects of wind pressures, without the use of diagonal bracings connecting the members of those angles.

The Eiffel Tower, therefore, has been well described as consisting essentially of a pyramid composed of four great curved columns, independent of each other, and connected together only by belts of girders at the different stories, until the columns unite toward the top of the tower, where they

are connected by ordinary bracing. Iron and not steel was used in the construction throughout.

There are four independent foundations, each standing at one angle of a square, about 330 feet on a side; the two piers nearest the Seine were known as numbers 1 and 4, those adjoining the Champ de Mars as 2 and 3. On the site of the two foundations 2 and 3, the bed of gravel was met with 23 ft. below the surface; the thickness at this point is about 18 ft. The conditions for obtaining a good foundation were therefore extremely favorable, and the piers were built upon a bed of cement concrete 7 ft. in thickness. The two piers nearest the Seine required different treatment. The bed of sand and gravel was only met with about 40 ft. below the surface; that is to say, about 16 feet lower than the mean water level of the Seine, and it was overlaid by soft and permeable deposits. Excavations were pushed, by means of caissons and compressed air, to a depth of about 53 ft. below the surface, and it was found that, under the gravel, variable deposits of fine sand, formed of limestone and sandstone, had accumulated, having been left there by the water after the clay had been washed out in hollows by the stream. Owing to this there existed a good and incompressible bed about

projecting white, blue, and red beams. Reflectors will throw these beams over Paris, and will help to illuminate the Champ de Mars.

Provision is made for protecting the structure from the effect of lightning by means of cast-iron pipes, 19 inches in diameter, and passing through the water-bearing strata below the level of the Seine for a distance of 60 feet. At one end these pipes are turned vertically, and are connected with the iron-work of the tower. There are eight pipes in all, two for each column.

The total weight of wrought and cast iron that has been used in this unique structure is 7,300 tons, not including the weight of the caissons employed in the foundations nor the machinery installed for working the elevators. The total weight of iron employed in the structure itself is 7,300 tons. The weight of rivets is 450 tons, and their total number 2,500,000. Of this quantity 800,000 were riveted up by hand on the tower itself, during the work of fixing together the finished pieces which had been completed at M. Eiffel's establishment. The number of pieces of iron of different forms is 12,000, and each of these required a special drawing; there were thus no less than 12,000 working drawings sent into the workshop, to say nothing of the innumerable sketches and details prepared before the final details were decided upon. The total thrust upon the foundations is 565 tons, not including the effect of wind, and 875 tons, under a maximum wind pressure.

The tower is painted of a rich chocolate color, the tone of which is lightened from the base toward the summit. The painting, which was of itself a considerable work, is very effective, especially when lighted by the sun. But little decoration has been attempted; it would have been wasted labor and expense. The level of the first story is marked by a bold frieze, on the panels of which, around all four faces of the tower, are inscribed in gigantic letters of gold the names of the famous Frenchmen of the present century who have most contributed to the advancement of science. Above this frieze the four-sided arcade covering the exterior gallery, is elaborately decorated, and considerable sketches and details taken to this feature as marrying the bold and graceful outline of the tower. A similar arcade encircles the tower at the level of the second story, and the same objection may be raised with regard to it, but with less force, because the great height makes the arcade look insignificant. The sloping arches and spandrel fillings which connect the columns of the tower on the four faces beneath the first story are singularly well adapted to the gigantic scale of the work.

There are three systems of elevators to be used in the tower. From the ground to what may be called the first story, where great restaurants will be established, there will be four elevators, two of the Otis pattern and two of the system of Roux, Combaluzier, and Lepape, in which the car is elevated by means of a jointed piston, which has been compared to a vertical column. From this story to the next one, about 400 feet from the ground, the Otis elevators only are employed in two of the legs of the tower. The cars of the French system in the two bottom lifts are adapted to carry one hundred passengers each, while the cars of the Otis elevators carry only fifty each, but their speed is double that of the others. The top lift, a vertical distance of 493 feet, is made by elevators on the Edoux system, in which the carriage is worked by an enormous piston. To go above this distance to the lantern will have to climb a spiral staircase.

The total height of the tower is 984.24 feet, or 300 meters, but the inclined or curved part of the legs considerably increases the length of travel of the elevators in these portions, a vertical height therein of 372 feet making an actual length of the curved part of 493 feet. The angle of inclination in this portion varies from 54° at the start to about 80° at the finish, but the carriages are so hung as to always accommodate themselves to the varying angle, so that their floors will be kept even. The steps leading to the different landing places are made to fold up when the car is traveling.

The great hydraulic cylinder of the Otis elevator, which is placed in the foot of the tower, perpendicularly to the cross-pieces and 38 inches in diameter and 41 feet long, while the circulating piston, valve, and water chest are all 9 inches in diameter. In this cylinder is a piston fed with water from reservoirs placed on the stage where the vertical portion of the tower commences, or at a vertical height of 372 feet above the lower end of the cylinder. The piston rod operates on a carriage bearing guide-wheels and multiplying pulleys, cables thence connecting with stationary multiplying pulleys, and the carriage being suspended by six ropes of steel wire. One of these ropes alone is designed to have sufficient strength to bear the carriage full of passengers without breaking. The carriage is partly counterbalanced, and rises or falls twelve feet for one foot movement of the piston. Under the cabin is a safety brake, with the jaws working automatically in case of rupture or of the elongation of one of the ropes.

The highest structures of ancient times are the pyramids of Old Egypt, the highest and best preserved of which are the pyramid of Cheops, near Ghizeh (450 feet high), and that of Chephren (448 feet high). Both of these are less than half as high as the Eiffel tower. Heretofore the highest building in Europe was the Cologne cathedral (about 523 feet high), and the highest in America, the Washington Monument (about 555 feet high). Both are greatly surpassed in height by the Eiffel tower.



EIFFEL TOWER.

10 ft. thick under the western pier on the Grenelle side, and nearly 20 feet thick under the north pier on the Paris side. Apart, therefore, from the difficulties in sinking for the foundations, the conditions were very satisfactory. The mode of sinking adopted was that of compressed air, with iron caissons 40 ft. 2 in. long by 19 ft. 8 in. wide; four such caissons were required for each pier, and they were sunk to a depth of 40 ft. below the surface, or 16 ft. lower than the Seine mean water level.

The tower terminates at a height of 896 feet above the ground, with a platform about 53 feet square. The width of the column at this level is 33 feet, the gallery being carried by brackets which are sufficiently wide to afford a considerable area of platform. It is almost unnecessary to state that this space is securely protected by a railing and glass to prevent any voluntary or involuntary catastrophe. Above the platform rises the campanile, which is of the design shown; in the lower part of this is established a spacious and very completely fitted laboratory, closed to the public and intended for the prosecution of scientific research and observation. Four latticed arched girders rise diagonally from each corner of the lower part of the campanile and unite at a height of about 54 feet above the platform. By means of a spiral staircase yet another gallery is reached, about 19 feet in diameter, and surrounding the lantern which crowns the edifice and brings the height of the structure to 984 feet. Above this rises the great lightning conductor. Within the lantern, which is 22 feet high, will be placed a very powerful electric light, placed within a lantern of the first order, and

EIFFEL, GUSTAVE, a French engineer, the designer and builder of the Eiffel Tower, Paris, born in Dijon, France, in 1832. He made the framework of Bartholdi's *Liberty*, and constructed the *Grand Vestibule*, and the principal façade of the Paris Exposition of 1876, a work costing 3,000,000 francs. Another of his principal works is the bridge at Oporto, on the Lisbon railway, one of the finest specimens of engineering skill in Europe, and the railway viaduct of Garabet over the valley of Truyère, France, costing 3,248,000 francs. In this case the opening of the arch is 165 meters, and the height above the water is 124 meters. He has also constructed several other railway bridges and aqueducts of note, as the bridges of Szeged, Hungary, 606 meters long, and the bridge at Vienna, Portugal, 736 meters long. In January, 1893, he was tried and convicted of misappropriating funds belonging to the Panama Canal Company and was sentenced to fine and imprisonment.



GUSTAVE EIFFEL.

EIFFEL, or EIFEL, THE, a barren and bleak plateau of Rhenish-Prussia, located between the rivers Rhine, Moselle and Roer, and showing extensive traces of volcanic activity. Its surface, which ranges at an average altitude of 1,500 to 2,000 feet, is for the most part broadly undulating, and diversified by crater-like depressions and volcanic peaks and ridges, whilst toward its edges it is seamed by deep, wooded, rocky ravines. Its highest and at the same time most inhospitable parts are in the west and northwest, whence it falls away gradually to the Rhine on the east and to the Moselle on the south. The central portion of the plateau is crossed by a range of basaltic summits, the loftiest in the Eiffel system, including the Hohe Acht (2,494 feet) Nurburg (2,255) and Kellberg (2,211). The ridges of the northwest are connected by the Hohe Venn with the Ardennes. Geologically, the basement of the plateau belongs to the Lower Graywacke of the Devonian formation, with eruptions of Eifel limestone, parts of which are rich in

fossils. Above this are deposited, with tolerable regularity in a horizontal position, strata of Triassic age, containing considerable quantities of metallic ores, especially zinc and lead. The Eiffel was for a long period the scene of volcanic activity; zones and islands of basalt are frequent, as also eruptive masses of basaltic lavas, with tufa and pumice. With the exception of the vine and fruit trees on the east and south edges of the plateau, and a little agriculture (up to 1,700 feet), the Eiffel is uncultivated, its rocky soil being too poor and its climate too raw and bleak for anything to grow but heather.

EIGHT, PIECE OF, a name once popularly given to the Spanish dollar, as being divided into eight reals.

EIK: in the legal phraseology of Scotland, an addition made to a document for the purpose of meeting circumstances which have subsequently arisen.

EIRE, EYRE, JUSTICES IN (corruption of *Latin itinere*). By this term, both in England and Scotland, were the judges of assize formerly designated. Justices in eire were first established in England by the statute of Northampton (1176 A. D.), in the reign of Henry II. At first, they made the circuit of the kingdom once in seven years; but by Magna Charta, c. 12, the chief Justices are directed to send justices through every county once in the year. The term is still in use in Scotland, where, at the commencement of every circuit, proclamation is made to the lieges to attend the "circuit eire."

EISENERZ, a small town of Austria, in the north of the province of Styria, 20 miles west-northwest of Bruck. It is worthy of mention only for its connection with the Erzberg (ore mountain), at the southern base of which the town lies. This mountain, which is about 2,840 feet high, and about five miles in circumference at the base, is literally a solid mass of iron ore, of a quality so rich, that, instead of cutting mines into it and following the metal in veins—which process was formerly adopted here—the top and sides of the rock are quarried from the outside, and the ore is then broken small, and conveyed to the smelting-house without further preparation. Mines have been worked on this mountain for upwards of 1,000 years.

EISENLOHR, AUGUST, German Egyptologist, born at Mannheim, Oct. 6, 1832. He studied theology at Heidelberg and Göttingen, and afterwards devoted considerable attention to natural science, especially chemistry. About 1865 he became interested in the study of Egyptian hieroglyphics, and in 1869 became instructor in Egyptology at the University of Heidelberg. Being sent by the Grand Duke of Baden to Egypt, he ascended the Nile to the second cataract, and returned through Palestine, Syria, and Asia Minor. In 1872 he was made professor extraordinarius in the University of Heidelberg. He has made valuable translations of papyri belonging to the British Museum.

EKA, in chemical nomenclature, is prefixed to the name of a known element to indicate a hypothetical element supposed to stand next to it in the same group. Thus, gallium, previous to its actual discovery, was provisionally named by Mendelejeff eka-aluminium.

EKATERINOGRAD, a town and fortress in the South of Russia, in the Government of Caucasus, situated on the left bank of the Terek, in lat. 40° 43' N., and long. 44° 3' E. It is an important military post of the Cossacks. A stone triumphal arch was erected at Ekaterinograd by Catherine II, in mem-

ory of Prince Potemkin, who founded the town in 1777.

EKOWE, the capital of the territory of Zululand. ELÆAGNUS, a genus of *Elæagnaceæ*, the oleaster family, of which there are about thirty-five species, all natives of north temperate countries. *Elæagnus angustifolia*, the oleaster, sometimes called wild olive, is a small spiny tree of the Mediterranean region, hoary with stellate hairs, and is frequently planted for its silvery white foliage and fragrant flowers.

ELÆOCARPACEÆ, a sub-order of *Tiliaceæ*, mostly East Indian trees. The fruits of some are eaten and the deeply-wrinkled stones, often called olive nuts, are made into beads for necklaces and bracelets in India.

ELÆOCOCCA, a genus of *Euphorbiaceæ*, the seeds of some of which yield useful oils. The oil obtained from *Elæococca verrucosa* is used for food in Japan, notwithstanding considerable acidity. The tree is cultivated in the Mauritius, and the oil is there used only for burning. That obtained from *Elæococca vernicia* of China is used in painting.

ELEODENDRON, a genus of trees of the natural order *Celastraceæ*, having a 5-partite calyx, 5 petals, a 5-angled disc, 5 stamens, the ovary immersed in the disc, and a drupaceous fruit. *Eleodendron glaucum*, a native of Ceylon and the South of India, is sometimes called the *Ceylon Tea-tree*, from the resemblance of its leaves to those of the tea-shrub. The timber of *Eleodendron croceum*, called *saffronwood* at the Cape of Good Hope, is much used there in building and cabinet-making; it is fine-grained, hard and tough. The fruit of *Eleodendron Kubu*, another South African species, is eaten by the colonists. That of *Eleodendron argan* yields an oil similar to olive oil, much used by the Moors.

ELANET (*Elanus*), a genus of *Falconidæ*, allied to the kites (see *Britannica*, Vol. XIV, p. 104), which they resemble in many of their characters; but from which they differ in having the short tarsi half covered with feathers, and the claws, except that of the middle toe, rounded beneath. The tail is very little forked. One species (*Elanus melanopterus*) is common in Africa, from Egypt to the Cape of Good Hope, and is found also in India. Another species is the black-shouldered hawk (*Elanus dispar*) of America, the northern limit of which appears to be South Carolina. Both of these feed chiefly on insects, which they catch on the wing, but they also prey on small birds and reptiles.

ELASTIC TISSUE, known also as yellow fibrous tissue, derives its name from the remarkable physical property which it possesses of permitting its fibers to be drawn out to double their length, and again returning to their original length. It occurs in various ligamentous and other structures of the animal body in which elasticity is required—as, for example, in the vocal chords, the membranes connecting the cartilaginous rings of the trachea, the middle coat of the arteries, the skin, etc.

ELATER, a Linnæan genus of coleopterous insects, now divided into many genera, and forming the tribe or family *Elateridæ*. They have a narrow elongated body; the head is in almost all cases inserted deeply into the thorax; a strong spine on the under part of the thorax at its base fits into a groove; the legs are short and rather slender. They are generally found upon the flowers and leaves of plants, which are their food. See *Britannica*, Vol. VI, p. 132.

EL BASSAN, a town of Turkey, in central Albania, 75 miles south-southeast of Scutari, with

manufactories of copper and iron wares. It is the seat of a Greek bishop. Population, 8,000.

ELBOW-PIECES: in armor, or *coudières*, the metal plates used to cover the junction of the rerebrace and vant-brace, by which the upper and lower half of the arm were covered.

ELDER, WILLIAM HENRY, born in Baltimore in 1819, educated at the College of the Propaganda in Rome, became Roman Catholic bishop of Natchez in 1857. In 1880 he became coadjutor archbishop of Cincinnati, and two years later, on the death of Archbishop Purcell, he became archbishop.

EL DORADO, city and county-seat of Butler county, Kan., situated on Walnut River. It has waterworks, gas, and electric lights, woolen and flour mills, machine shop, iron foundry, and extensive quarries. Pop. (1890), 3,339.

ELDORADO SPRINGS, a popular health resort of Missouri, located in the northwestern part of Vernon county. It is a rapidly growing town, its popularity being due to the presence of several springs, whose waters are chalybeate.

ELDRED, a railroad junction of McKean county, Pa., 24 miles east of Bradford.

ELECTION, in theological language, denotes the divine act by which certain individuals are chosen to salvation in Christ. It is defined in the seventeenth of the thirty-nine articles.

ELECTION LAWS OF THE UNITED STATES. Under the Federal Constitution the jurisdiction of the election laws of the United States extends only to the elective officers of the Federal Government. These are the President, Vice-President, and members of the House of Representatives. The State legislatures determine severally the qualifications for voting in those States.

All the States except Wyoming restrict the right to vote at general elections to males of 21 years of age and upwards. In Wyoming women have voted on the same terms with men since 1870. They requested the constitutional convention to guarantee suffrage to them in 1889. This was done with practical unanimity in convention and at the polls. As Congress declared that it "accepted, ratified and confirmed" this constitution, women have the full right of suffrage in Wyoming. In Kansas women have suffrage on the same terms with men in all municipal elections; and in Delaware municipal suffrage is accorded them in many places, school suffrage being universal throughout the State. In Montana women have the right to vote on questions of local taxation. In Washington Territory women voted generally for five years, and then were excluded by decision of the Territorial Supreme Court. In adopting a State Constitution the women were not permitted to vote, and the woman suffrage clause was defeated. The women assert that they were illegally prevented from voting, and have appealed to the United States Supreme Court. In Utah women voted until excluded by the Edmunds law. In Pennsylvania women can vote on local improvements, by signing or refusing to sign petitions therefor. In New York women can vote at school elections, at water-works elections, and on questions of paving, grading, drainage, street lighting, and other local improvements. The right to vote at school elections is also accorded to women, on various terms, in Arizona, Colorado, Idaho, Indiana, Kansas, Kentucky, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, North Dakota, Oregon, South Dakota, Texas, Vermont, Washington and Wisconsin. In Arkansas and Missouri women vote (by signing or refusing to sign petitions) on granting liquor licenses.

QUALIFICATIONS OF VOTERS IN THE SEVERAL STATES.

States.	Requirements as to Citizenship.	Previous Residence Required.				Persons Excluded from Suffrage.
		In State.	In County.	In Town.	In Precinct.	
Alabama.....	Citizen of United States or alien who has declared intention.	1 year.	3 mos..	30 days	30 days	Convicted of treason or other crime punishable by imprisonment, idiots, or insane.
Arkansas.....	Citizen of United States or alien who has declared intention.	1 year.	6 mos..	.....	1 mo..	Idiots, insane, convicted of felony, until pardoned.
California.....	Citizen by nativity, naturalization, or treaty of Quere-taro.	1 year.	90 days	.....	30 days	Chinese, insane, embezzlers of public moneys, convicted of infamous crime.
Colorado.....	Citizen or alien who has declared intention 4 months previous to offering to vote.	6 mos..	90 days	.....	10 days	Convicted of felony and unre-stored to citizenship.
Connecticut.....	Citizen of United States who can read constitution or statutes.	1 year.	.....	6 mos..	.....	Convicted of any offense for which infamous punishment is inflicted.
Delaware.....	Citizen, and paying county tax after age 22.	1 year.	1 mo..	.....	15 days	Idiots, insane, paupers, felons.
Florida.....	Citizen of United States or alien who has declared intention, who has paid capitation tax 2 years.	1 year.	6 mos..	.....	(a)	Insane, under guardianship, convicted of felony, or any infamous crime.
Georgia.....	Citizen of the United States..	1 year.	6 mos..	.....	.....	Idiots, insane, convicted of crime punishable by imprisonment.
Idaho.....	Citizen of the United States..	6 mos..	30 days	.....	.....	Chinese, Indians, Mormons, felons, insane, convicted of bribery.
Illinois.....	Citizen of the United States..	1 year.	90 days	30 days	30 days	Convicted of crime punishable in penitentiary until pardoned and restored to rights.
Indiana.....	Citizen of United States or alien who has declared intention and resided one year in United States and 6 months in State.	6 mos..	.....	60 days	30 days	Convicted of crime and disfranchised by judgment of the court.
Iowa.....	Citizen of the United States..	6 mos..	60 days	.....	(a)	Idiots, insane, convicted of infamous crime, United States soldiers and marines not bona fide residents.
Kansas.....	Citizen of United States or alien who has declared intention.	6 mos..	.....	.....	30 days	Idiots, insane, convicts, rebels, public embezzlers, bribed.
Kentucky.....	Citizen.....	2 yrs*..	1 year.	.....	60 days	Convicted of robbery, forgery, counterfeiting or like crime.
Louisiana.....	Citizen of United States or alien who has declared intention.	1 year.	6 mos..	.....	30 days	Idiots, insane, convicted of treason, embezzlement of public funds, all crime punishable by imprisonment in penitentiary.
Maine.....	Citizen of the United States..	3 mos..	3 mos..	3 mos..	.....	Paupers, persons under guardianship, Indians not taxed.
Maryland.....	Citizen of the United States..	1 year.	6 mos..	.....	1 day..	A person over 21 years convicted of larceny or other infamous crime, unless pardoned, persons under guardianship, as lunatics or non compos mentis.
Massachusetts.....	Citizen who can read Constitution in English, write, and has paid tax within 2 years.	1 year.	.....	6 mos..	30 days	Paupers (except honorably discharged U. S. soldiers and sailors) and persons under guardianship.
Michigan.....	Citizen or inhabitant who has declared intention under U. S. laws 6 months before election.	3 mos..	.....	10 days	10 days	Aliens who have not declared intention 6 months previous to election, Indians, duelists and accessories.
Minnesota.....	Citizen of United States or alien who has declared intention, and civilized Indians.	4 mos..	10 days	.....	10 days	Convicted of treason or felony, unless pardoned, persons under guardianship or insane.
Mississippi.....	Citizen of the United States who can read or understand Constitution after January 1, 1892.	2 yrs... 1 year.	.....	.....	1 year.	Insane, Indians not taxed, felons, persons who have not paid taxes.
Missouri.....	Citizen of United States or alien who has declared intention not less than one year or more than five before offering to vote.	1 year.	60 days	60 days	.....	U. S. soldiers and marines, paupers, criminals convicted once until pardoned, felons and violators of suffrage laws convicted a second time.

*Unless there has been one year's previous residence in the county. +Australian Ballot Law or a modification of it in force. †And one year's residence in United States prior to voting. (a) Actual residence in the precinct or district required.

QUALIFICATIONS OF VOTERS IN THE SEVERAL STATES—Continued.

States.	Requirements as to Citizenship.	Previous Residence Required.				Persons Excluded from Suffrage
		In State.	In County.	In Town.	In Precinct.	
Montana†.....	Citizen of the United States..	1 year.	30 days	30 days	30 days	Indians, felons not pardoned.
Nebraska.....	Citizen of United States or alien who has declared intention thirty days prior to election.	6 mos..	40 days	.....	10 days	Idiots, insane, convicted of treason or felony, unless pardoned.
Nevada.....	Citizen of the United States..	6 mos..	30 days	.....	.....	Idiots, insane, convicted of treason or felony, unarmisted Confederates who bore arms against the United States.
New Hampshire.....	Inhabitant, native or naturalized.	6 mos..	.....	6 mos..	.....	Paupers (except honorably discharged U. S. soldiers and sailors), persons excused from paying taxes at their own request.
New Jersey†.....	Citizen of the United States..	1 year.	5 mos..	.....	.....	Idiots, insane, persons convicted of crimes (unless pardoned), which exclude them from being witnesses, which crimes include blasphemy, treason, murder, rape, sodomy, arson, perjury, etc.
New York†.....	Citizen who shall have been a citizen for ten days.	1 year.	4 mos..	.....	30 days	Convicted of bribery or any infamous crime, unless pardoned, bettors on result of any election at which they offer to vote, bribers for votes and the bribed.
North Carolina.....	Citizen of the United States..	1 year.	90 days	.....	.....	Convicted of felony or other infamous crime.
North Dakota.....	Citizen of the United States, alien who has declared intention and civilized Indian*	1 year.	6 mos..	.....	90 days	United States soldiers and sailors, persons <i>non compos mentis</i> , and felons.
Ohio.....	Citizen of the United States..	1 year.	30 days	.....	20 days	Felony until pardoned and restored to citizenship, idiots, insane.
Oregon.....	Citizen of United States or alien who has declared intention one year preceding election.	6 mos..	.....	.....	.....	Idiots, insane, convicted of felony, United States soldiers and sailors, Chinese.
Pennsylvania.....	Citizen of the United States at least one month, and if 22 years old or more must have paid tax within two years.	1 year†.	.....	.....	2 mos..	Convicted of some offense whereby right of suffrage is forfeited, non-taxpayers.
Rhode Island.....	Citizen of the United States..	2 years	.....	6 mos..	.....	Paupers, lunatics, persons <i>non compos mentis</i> , convicted of bribery or infamous crime until restored to right to vote, under guardianship.
South Carolina.....	Citizen of the United States..	1 year.	60 days	.....	.....	Convicted of treason, murder, or other infamous crime, or of dueling, paupers, insane.
South Dakota.....	Citizen of the United States or alien who has declared intention.	6 mos. §	6 mos..	.....	30 days	Under guardianship, idiots, insane, convicted of treason or felony, unless pardoned.
Tennessee†.....	Citizen of the United States..	1 year.	6 mos..	.....	(a)	Convicted of bribery or other infamous offense.
Texas.....	Citizen of the United States or alien who has declared intention.	1 year.	6 mos..	.....	(a)	Idiots, lunatics, paupers, supported by county, convicted of felony, United States soldiers and seamen in service.
Vermont†.....	Citizen of the United States..	1 year.	.....	6 mos..	.....	Unpardoned convicts and deserters from United States military or naval service during civil war, ex-Confederates.
Virginia.....	Citizen of the United States..	1 year.	3 mos..	3 mos..	30 days	Idiots, lunatics, convicted of bribery at election, embezzlement of public funds, treason, felony and petty larceny, duellists and abettors, unless pardoned by legislature.
Washington†.....	Citizen of the United States..	1 year.	90 days	.....	30 days	Indians not taxed.
West Virginia.....	Citizen of the State.....	1 year.	60 days	.....	(a)	Paupers, persons of unsound mind, convicted of treason, felony or bribery at elections.
Wisconsin†.....	Citizen of the United States or alien who has declared intention.	1 year.	.....	.....	10 days	Insane, under guardianship, convicted of treason or felony, unless pardoned.
Wyoming.....	Citizen of the United States or alien who has declared intention.	6 mos..	30 days	.....	.....	Under guardianship, idiots, insane, unpardoned felon, bettors on elections.

*Indian must have severed tribal relations two years next preceding the election. †Australian ballot law or a modification of it in force. ‡Or if, having previously been a qualified elector or native, he shall have removed and returned, then 6 months. §One year's residence in the United States prior to election required. (a) Actual residence in the precinct or district required.

REGISTRATION.

Voters are required to register in Alabama, California, Colorado, Connecticut, Florida, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Nevada, New Hampshire, North Carolina, Pennsylvania, South Carolina, Vermont and Virginia. In Georgia registration is required in a few counties; in Iowa, Kansas and Nebraska, in all cities. In Illinois registration is required, but, except in a few cities, a legal voter not registered may vote upon filing an affidavit by himself and another known legal voter that he is a qualified voter and has not already voted. In Minnesota registration is required in all cities of 1,200 inhabitants or over; in Missouri, in cities of 100,000 inhabitants and over; in New Jersey, in cities of over 10,000 inhabitants; in Wisconsin, in cities of 20,000 inhabitants or over; in Ohio, registration is generally required. Registration is not required in Arkansas, Delaware, Indiana, Kentucky, Oregon, Tennessee, Texas and West Virginia. It is prohibited in Arkansas, Texas and West Virginia by the constitution. In New York, voters in cities must register personally; in all other places within the State they may register on the first two registration days by proxy.

ELECTORAL COMMISSION, a special commission appointed by act of the United States Congress approved Jan. 29, 1877, for the purpose of determining the electoral votes of the States of Florida, Louisiana, and South Carolina and of one vote of the State of Oregon, in the Presidential election of November, 1876. The commission consisted of United States Supreme Court Justices Clifford, Strong, Miller, Field and Bradley; United States Senators Edmunds, Morton, Frelinghuysen, Thurman and Bayard, and United States Representatives Payne, Hunton, Abbott, Garfield, and Hoar.

The question before the commission was of the gravest national interest. Its answer would practically decide the choice of the nation with regard to the ensuing Presidential administration. The appointment of the commission was the result of prolonged discussion in both houses of Congress, and this plan of averting an impending evil was reported by a joint committee, representing not only both the Senate and House of Representatives, but also most equably the two great political parties. This joint committee was composed of Senators Geo. F. Edmunds, of Vermont; Frederick T. Frelinghuysen, of New Jersey; Roscoe Conkling, of New York; Allen G. Thurman, of Ohio; Thomas F. Bayard, of Delaware, and Oliver P. Morton, of Indiana. Also of Representatives Henry B. Payne, of Ohio; Eppa Hunton, of Virginia; Abram S. Hewitt, of New York; William Springer, of Illinois; Geo. W. McCrary, of Iowa; Geo. F. Hoar, of Massachusetts, and Geo. Willard, of Michigan. Of this committee seven were Republicans and seven were Democrats. The committee reported the bill Jan. 18, 1877, and, with the exception of a single dissident (Senator Morton), by a unanimous recommendation. The bill provided for the creation of the Electoral Commission, to be composed of five Sen-

ators, five Representatives, and five Associate Justices of the United States Supreme Court, four of the latter being designated by their districts in the bill itself, the fifth to be chosen subsequently by those four. All certificates and other documents from the contesting parties, and all questions relating to the powers of Congress in the premises (with the authority to exercise the same powers in ascertaining the legal vote of each State) were to be referred to this commission as a tribunal; and the decision in each case to stand as final, *unless rejected by the concurrent vote of both houses of Congress*. The bill also provided that objections that might be made to any electoral votes from States not presenting double certificates should be considered not by the commission but by the houses separately, and unless sustained by both should be of no effect.

The bill thus reported with such remarkable unanimity was submitted to extended discussion in both houses, resulting in its adoption by the Senate, Jan. 25, by a vote of 47 yeas to 17 nays (the Republicans 24 yeas to 16 nays, and the Democrats 23 yeas to one nay); absent or not voting, nine Republicans and one Democrat. The vote was taken in the House, Jan. 26, resulting in the adoption of the bill by a vote of 191 yeas to 86 nays (the Democrats 158 yeas to 18 nays, and the Republicans 33 yeas to 68 nays); absent or not voting, seven Republicans and seven Democrats.

As a majority of the Senate was Republican, and a majority of the House Democratic, it was agreed that three Republicans and two Democrats should be selected from the Senate and three Democrats and two Republicans from the House. Of the United States Supreme Court Justices the four, as stated above, were designated in the report of the joint committee, namely: Justice Clifford, of Maine; Justice Miller, of Iowa; Justice Field, of California, and Justice Strong, of Pennsylvania. These four appointed, as the fifth, Justice Joseph P. Bradley, of New Jersey.

The commission perfected its organization Feb. 1, 1877, and closed its work Feb. 27, and its decision was reported at the joint electoral convention of the two houses of Congress held March 1, resulting in the announcement early the next morning that Rutherford B. Hayes, of Ohio, and William A. Wheeler, of New York, had been elected, respectively, President and Vice-President of the United States.

ELECTORAL CROWN, or, more properly, CAP, was a scarlet cap, turned up with ermine, which was worn by the electors of the German Empire. It was closed with a demi-circle of gold, covered with pearls, and on the top was a globe with a cross on it, also of gold.

ELECTRICITY

FOR the general subject of electricity, and an elaborate and exhaustive discussion of the methods of applied electricity, brought down to the year 1878, see *Britannica*, Vol. VIII, pp. 3-105; also see *TELEGRAPH*, Vol. XXIII, pp. 112-126. It is only required in these Revisions and Additions that a record should be outlined of the later discoveries and progress in electrical science, and especially in applied electricity.

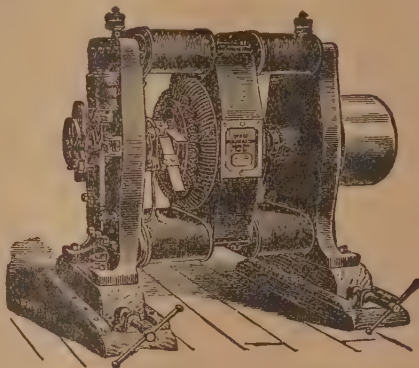
ELECTRIC LIGHTING.—The principal uses to which electricity is put to-day, outside the all-important classes of electric signaling and electro-chemical work, are for furnishing light, heat, and power; and of these three applications that of electric lighting is perhaps the most important. There are two kinds of lamps in use, entirely dissimilar in principle and construction, and used for entirely different purposes.

In one, known as the "arc" light, the light is obtained by causing a heavy current of electricity to cross a small space, taking a slightly curved path, called the electric arc, from which its name is derived. This is the intensely brilliant light used for street lighting. In the other, known as the "incandescent," the light is produced by passing a small current through a fine wire or filament, which it heats to a dazzling brilliancy or incandescence.

The arc light, which is much older than the incandescent, is now produced practically by passing a powerful current between the points of two large carbon rods, which are kept close together by an automatic mechanism known as the regulator of the lamp. The space allowed between the tips of the rods, across which the current jumps, is about one-sixteenth of an inch, and the

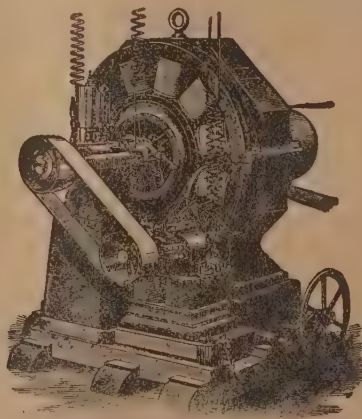
duty of the regulator is to move one of the rods toward the other as fast as the tips are burned off by the intense heat, keeping the space to be jumped by the current as nearly uniform as possible. The carbon rods are placed perpendicularly, one above the other. The electric current, after reaching the upper carbon, passes across the tips and through the lower carbon, thence through a wire which is wound around a magnet, thence to the continuation of the line, and on to the next lamp. This magnet attracts a lever which, when raised, grasps the upper carbon through the agency of a washer which allows the carbon to slide downward through it except when it is tilted by the action of the magnet and lever. The upper carbon is arranged in suitable guides to slide straight up and down, and the lower carbon is held stationary. When at rest the washer lies flat, and the upper carbon slides down until in contact with the lower one. When the current is turned on it passes across the tips of the carbons, which at first are in contact, and around the magnet, causing it to raise the lever, tilt the washer till it grasps the carbon, and thus elevates the movable carbon until the increased length of the space between the tips weakens the current and checks the lifting action of the magnet. The light then

burns steadily until enough of the tip is burned off to further weaken the current by increasing the space, when the magnet, being no longer able to support the carbon, lowers it enough to re-adjust the space.



WOOD DYNAMO.

So long as the source of power for producing the electricity was the galvanic battery, experience of this promising illuminator only served to lay bare its practical defects. It was found to be unsteady, flickering, and unreliable, and although great ingenuity was displayed in producing electric lamps but little real progress was made. The first magneto-electric machine, the forerunner of the dynamos of the present day, was exhibited at the French Académie des Sciences in 1832. With this machine sparks and strong shocks were obtained, water decomposed, etc. In 1841 Wheatstone pat-



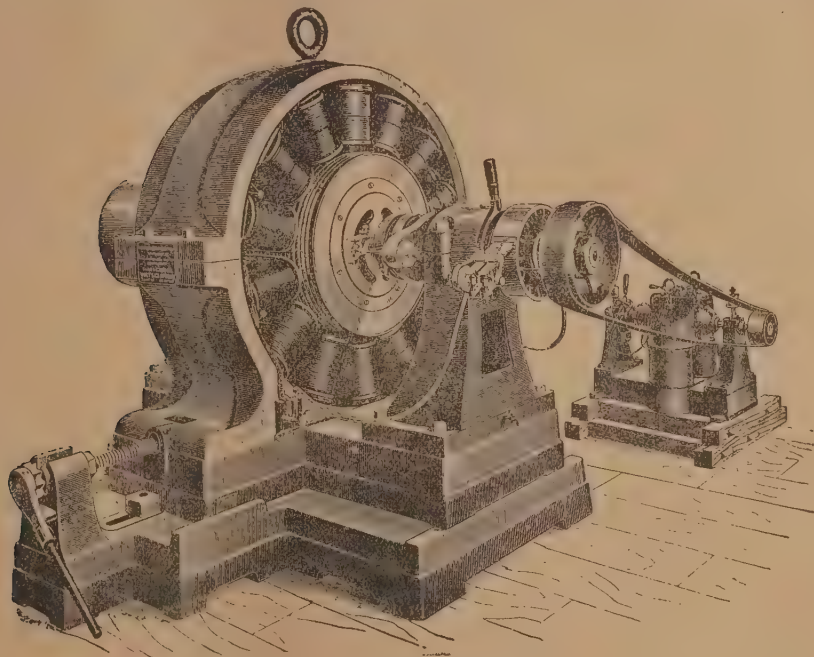
SLATTERY INCANDESCENT DYNAMO.

ented a plan by which more powerful effects could be obtained by combining several machines together. The next important advance was made in 1866, when H. Wilde, of Manchester, Eng., announced the somewhat paradoxical principle that a current or magnet indefinitely weak could be made to pro-

duce a current or a magnet of indefinitely great strength. Carrying out this principle, Wilde constructed a very powerful machine, which, turned by a steam engine, produced such a powerful electric current that an iron rod 15 inches long and a quarter of an inch thick was melted, and an electric light produced between carbon points of an intensity sufficient to cast shadows from the flames of ordinary gas burners a quarter of a mile distant from the source of light. The "reaction" principle in magneto-electric machines was discovered the same year (1866). In the machine of Wilde, the starting point of the source of power was a permanent steel magnet, but in the reaction principle the residual magnetism which is always found more or less in soft iron was made use of to originate the electric current. This principle has been far-

reaching in its results, and upon it all the numerous "dynamoes" of the present day are worked.

In 1870 another important advance in "dynamo-electric" machines was made by Z. T. Gramme, of Paris. Gramme's machine involved the new principle of forming the movable part of the machine of an endless ring of soft iron round which was coiled a series of bobbins of wire, all connected together. By this invention a nearer approximation to a continuous electric current was obtained than by any previous form of machine. After this, invention followed invention, step by step, each one perfecting the dynamo machine more and more, so that not only were these machines made more compact and better generally in design, but the electric power obtained from them for a given amount of horse power used to drive them continually,



IMPROVED DYNAMO.

also approached nearer the theoretical limit, until but little further improvement seems possible except in small matters of detail.

While the dynamo was thus being gradually developed towards theoretical perfection, regard was also had to the bettering of the carbon points or luminous electrodes of the light. The wasting of the carbon points necessitated a contrivance for regulating the distance between the points so as to keep the arc of sensibly constant width. In 1876, P. Jablochhoff, a Russian, introduced a modification of the arc lamp by which all regulating mechanism was dispensed with. The invention was called an electric "candle," and promised very great things. In spite, however, of the progress made in "arc" electric lighting, the general results were not completely satisfactory except for special purposes, and it is difficult to say what the fate of

such lighting would have been; but in September, 1878, Thomas E. Edison, of New York, announced his discovery of a method of dividing the electric light, so as to obtain from a given current many lights of moderate power in the place of one of excessive brightness. He constructed an incandescent electric lamp, or glow lamp, in which the current is made to pass through a strip of some substance, which, because of its high resistance, becomes highly heated, and hence brilliantly incandescent. He employed for this substance carbon in the form of a thin strip or wire, carefully prepared for the purpose and bent in a loop, inclosed in a bulb of glass from which the air had been exhausted. The vacuum prevented the consumption of the carbon at the high temperature to which it was raised. These lamps are readily applied to the existing gas fixtures at moderate cost, and

mark an important era in the progress of electric lighting. The demand for incandescent lamps has



INCANDESCENT LAMP.

been enormous, so that at the present time there are over 3,000,000 in use in the United States.

PORTABLE ELECTRIC LAMP.—A device intended for street or lawn lighting at points where an electric lighting current is not accessible, is among the recent inventions in electrical apparatus. The device comprises, as will be understood from an inspection of the illustration, a case or stand provided with shelves, upon which a series of secondary battery cells may be mounted, and carries a bracket, to which is secured an incandescent lamp. The device is controlled by a time switch so that the circuit may be closed and the lamp lighted at any desired hour. The case is provided with a door in which is arranged a bull's-eye, through which the clock may be seen when the door is closed. The apparatus when completed weighs about 200 pounds, which gives it sufficient stability for the purposes for which it is designated.

Another form of portable electric lamp, illustrated in the accompanying cut, was exhibited at a recent electrical exhibition in Paris by M. Laroche. The battery is inclosed in the lower part, and consists of an ebonite vessel divided into eight compartments by partitions, furnishing eight cells, or elements, in a very compact form. The vessel will hold about three liters of liquid, capable of acting for about eight hours without exhaustion. Each element is made up of a rod of zinc and two rods of carbon fixed to a disk which can be lowered into the liquid, or lifted out of it, by turning a key



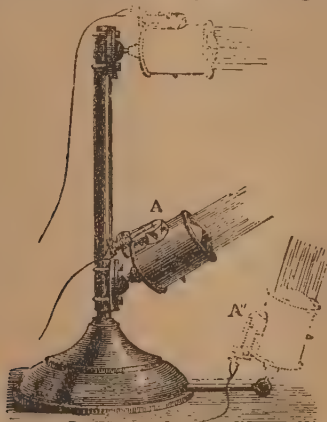
PORTABLE ELECTRIC LAMP.



PORTABLE ELECTRIC LAMP.

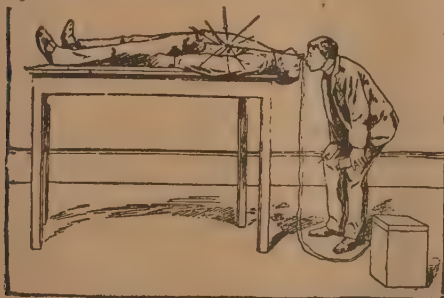
like that used in a Carcel oil-lamp. The power of the lamp is regulated by the depth to which the zincs and carbons are immersed. The zincs are screwed into the disk so as easily to be removed for renewal.

THE ELECTRIC LIGHT IN MICROSCOPY.—The incandescent electric light is very highly recommended as a substitute for the usual lamps used in microscopy, or even for the direct daylight. A small lamp, which only requires one cell of a bichromate battery to operate it, and which can be adjusted to any position, is now made for this purpose. Among the advantages of the electric light are its intensity, which allows the use of very oblique rays in illuminating the object; the larger proportion of white and blue rays in the light, which



ELECTRIC LIGHT IN MICROSCOPY.

bring out the finer details more clearly; the small amount of heat given out, which enables the lamp to be placed as close to the condenser of the microscope as may be desired; and the doing away with the necessity of a mirror to reflect the light upon the object, since the lamp can be placed in any desired position in reference to it. It is also claimed that the light is less fatiguing to the eye than even ordinary daylight; while, for purposes of micro-photography, the large proportion of actinic rays in the electric light and the ease with which it can be regulated render it far superior to any other illuminant.



EXAMINING THE STOMACH BY ELECTRIC LIGHT.

ILLUMINATING THE STOMACH BY ELECTRIC LIGHT.—Medical electricians have recently devised a plan by which the interior of the human stomach may

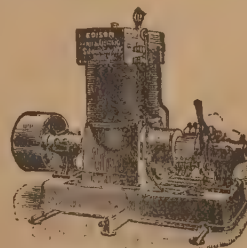
be illuminated for examination. The patient is laid upon the operating table, and a slender tube carrying a glass bead upon its end is introduced into the stomach. A small light inside the bead is supplied by fine wires running out through the tube and connected to a small battery. The interior of the stomach is plainly lighted, and all its parts are brought into view by a small movable mirror at the end of the tube.



CAUTERY WIRE HEATED BY ELECTRICITY.

CAUTERY WIRE HEATED BY ELECTRICITY.—Another application of electricity for physicians is the electro-cautery shown in the accompanying illustration, by which the principle of electric heating is applied to surgical operations. The instrument consists of a loop of fine platinum wire mounted in a rubber handle, through which connecting wires pass. These wires are led to a battery, the current from which follows the wires, and keeps the platinum loop white-hot. The heat is inside the wire, as it were, and can be regulated to any intensity, and kept there during an operation without withdrawing the instrument for reheating.

ELECTRIC LIGHTS FOR CARRIAGES.—In Paris numerous private carriages are now fitted up with incandescent electric lamps, instead of the old-fashioned candles or oil lamps. Not only are the regular side-lights thus arranged, but the interior of the vehicle is also illuminated by a lamp sufficiently powerful to read by; and a similar lamp is sometimes placed on the head of the horse, producing a very brilliant and "stylish" effect. These lamps are connected by wires with small accumulators placed under the driver's seat. These accumulators are only about eight inches square and four inches high, and each one will supply a lamp of 5-candle power for six hours. During the day they are removed, charged with electricity from a dynamo-machine or otherwise, and at night they are ready for service.



EDISON GENERATOR.

ELECTRIC LIGHT AND PLANTS.—At the Winter Palace, St. Petersburg, Russia, there is a noted collection of ornamental plants, especially of fine palms, grown for decoration of the banqueting halls of the palace. Since the introduction of the electric light these plants have been greatly injured. The illumination of a room for a single

night will cause the leaves to turn yellow, dry up, and finally fall off. The days in winter at St. Petersburg are almost sunless, and the sudden change from this dim light to the blinding glare of the electric lights is more than the plants can bear. Plants that are partly shaded escape injury to their foliage.

SUBMARINE TELEGRAPHY.—The first submarine cable was laid across the English Channel, from Dover, England, to Calais, France in 1850. Being unprotected it lasted but a few hours. The connecting wires (27 miles long) were placed on the government pier in Dover harbor, and in the *Goliath* steamer were coiled about 30 miles in length of telegraphic wire, inclosed in a covering of gutta-percha, half an inch in diameter. The *Goliath* started from Dover, unrolling the telegraphic wire as it proceeded, and allowing it to drop to the bed of the sea. In the evening the steamer arrived on the French coast, and the wire was run up the cliff at Cape Grisnez to its terminal station, and messages were sent to and fro between England and France. But the wire, in settling into the sea bottom, crossed a rocky ridge, and snapped in two, and thus the enterprise for that time failed. A stronger cable was prepared, the type of which is used at the present day almost entirely unmodified, and in November, 1851, was laid between Dover and Calais, and successfully operated.

The practicability of submarine telegraphy being thus established, lines rapidly multiplied. In May, 1853, a cable was successfully laid and operated between Dover and Ostend, and in the following year connection was established between Holyhead and Howth, and between Paris and Bastia.

As early as 1845 a plan to unite Europe and America by telegraph was entered at the government registration office in England, and proposals for carrying out the plan were submitted to the government, but were not accepted. In 1857 the plan was attempted to be carried out by a company, with the concurrence of the British and American governments. The cable, 2,500 miles in length, having been constructed, and thoroughly tested, the work of laying it down commenced at Valentia, in Ireland, Aug. 5, 1857. Four vessels were employed; two American, the *Niagara* and *Susquehanna*, and two British, the *Leopard* and *Agamemnon*. After sailing a few miles the cable snapped. This was soon repaired, but on August 11, after 300 miles of the cable had been laid, it snapped again, and the vessels returned to Plymouth. A second attempt to lay the cable, made in June of the following year, was defeated by a violent storm. Later in the year a third attempt was made, which was entirely successful. The junction between the two continents was completed by the laying down of 2,050 miles of cable, from Valentia, Ireland, to Newfoundland. The first two messages were sent Aug. 5, 1858, and were: one from the Queen of England to the President of the United States, and the other his reply. This event caused great rejoicing in both countries; but, unfortunately, the insulation of the wire being faulty, the power of transmitting intelligence ceased a month later.

A new company was formed in 1860, but it was not till 1865 that the work of laying down a new cable was undertaken. The *Great Eastern* steamer, engaged to lay down 2,300 miles of cable, with 25,000 tons' burden, sailed for Valentia, July 15, 1865. After connecting the cable with the land, the *Great Eastern* sailed from Valentia, July 23. Telegraphic communication with the vessel (interrupted by two faults, due to defective insulation, caused by pieces of metal pressed into the gutta

percha coating, which were immediately repaired) finally ceased Aug. 2. The apparatus for raising the wire proving insufficient, the vessel returned to England.

During the winter the Atlantic Telegraph Company was reconstituted as the Anglo-American Telegraph Company, and in June, 1866, the *Great Eastern*, with a new cable on board, again sailed for Valentia. The shore end was spliced with the main cable, and July 13, 1866, the *Great Eastern* sailed for America, reaching Heart's Content, Newfoundland, and completing the laying of the cable July 27, 1866. During the same year the lost cable of 1865 was recovered, and its laying completed at Newfoundland.

Prior to this cables had been laid connecting London with Constantinople, Cromer with Enden, Aden with Suez, Malta with Alexandria, England with Bombay, and Marsala with La Calle.



RECORDING AND ALARM GAUGE.

In 1868 the French government granted a concession for 20 years to Julius Reuter and Baron Emile d'Erlangen, for a French Atlantic telegraph line; and the European end of the cable was laid at Brest, June 17, 1869, and the American end at Duxbury, Mass., July 23, 1869.

In 1870 a cable was laid between Bombay and Suez, and in 1873 the fourth Atlantic cable was laid by the *Great Eastern* from Valentia, Ireland, to Heart's Content, Newfoundland. The Brazil telegraph cable was also opened in September, 1873.

In 1874 a great electric cable ship, the *Faraday*, was constructed, and sailed to lay the "Direct United States Company's cable," May 16. The shore end was laid in Nova Scotia, May 31, in New Hampshire, June 8, and connected with Newfoundland in July. The sixth Anglo-American telegraph was laid by the *Great Eastern* in August and September of the same year.

In December, 1879, the South African cable line between Mozambique and Natal was opened to the

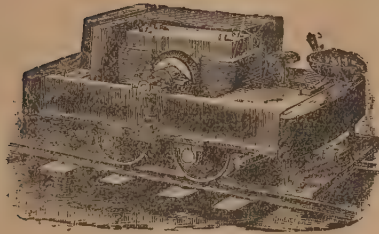
public, and June 1, 1883, a new French Transatlantic cable from Brest to New York was completed. The following year a new Atlantic cable was laid by the *Faraday*, and in September, 1882, a line was completed from England to Panama.

During the last decade lines have multiplied until there are now (1891) 942 submarine cables, exclusive of the seven working Atlantic cables, with an aggregate length of 112,740 nautical miles. For laying and maintaining this huge network of cables, a fleet of nearly 40 vessels is constantly occupied.

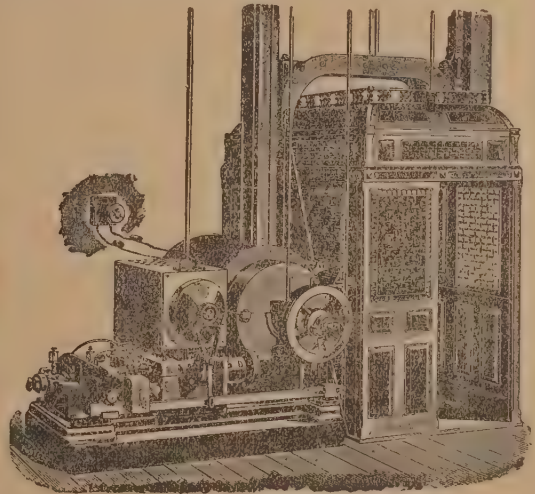
THE PHONOPORE.—The phonopore is a telegraphing device invented by Mr. Langdon-Davies, of London. Some two or three years ago, he first developed the system of transmitting signals through circuits which in the ordinary sense are not closed. Recent experiments in his laboratory were made through an artificial line of 4,000 ohms' resistance, and comprised the sending of phonopore messages alone, and of phonopore and telegraph messages simultaneously, in the same wire, and in the same or opposite directions. In one experi-

ment the same wire transmitted a telegraph message and two phonopore messages simultaneously, and the working of the phonopores was perfect, even after the resistance of the line had been increased to 23,000 ohms, when the telegraph messages, which were received by needle instruments, could no more be read. A further experiment was made with a line wire open at both ends, and containing a resistance of 100,000 ohms. In this case the ordinary telegraph could, of course, not be worked at all, but duplex working of the phonopore was perfectly feasible.

At St. Pancras, messages were being sent by phonopore between London and Leicester in both directions, on one of the company's wires which all the time transmitted ordinary telegraph messages. The London phonopore was joined to the line between two Morse relays about half a mile apart, one at the passenger and the other at the goods station, while the Leicester phonopore tapped the line thirty miles from the nearest telegraph instrument, which is at Derby. Between Leicester and London there are on this wire about six telegraph



ELECTRIC LOCOMOTIVE.



ELECTRIC ELEVATOR.

instruments, and as during operation the continuity of the line is constantly being broken by the working, each instrument is shunted by a phonopore, so that the phonopore messages are translated some six times.

This method of bridging the telegraph instruments does not in any way diminish the clearness of signals as compared with a continuous wire. The messages were printed on a Morse receiver, which was actuated by a phonopore relay. The phonopore transmitter has a vibrating reed, and the distant phonopore receiver is also provided with a reed in the shape of a stretched steel band, which can be tuned to the same note.

TELEGRAPHING FROM A TRAIN IN MOTION.—One of the latest inventions in the art of telegraphing is a device by means of which messages may be sent to and from a railroad train when traveling at any speed. The surprising feature of this invention is that there is no connection between the train and the telegraph wire beside the track, over which the messages travel to the station, after jumping from

the car to the wire. The message is telegraphed from inside to the tin roof of the car, and reaches the regular telegraph wire along the track by means of lines of force which each signal throws through the air as soon as it reaches the roof. The signals created in the main line in this way are much fainter than the ordinary telegraph signals, but this difficulty is easily overcome by using more sensitive receiving instruments. The operation of telegraphing to the car is carried on in the same way. The message is sent along the line, and imparts a slight electrical effect to the metallic car roof at each signal. The weak signals thus produced in the car roof are listened to with a delicate receiving instrument in the hands of the operator. As the main-line wire is parallel with the track, it makes no difference where the car is; and as the action of electricity is almost immeasurably quick, it makes no difference how rapidly the car is moving. The only special construction required to adapt a line for use with this system is that the wire be strung on rather short poles, so as

to bring it near the roofs of the cars. The instruments for the operator on the train are portable, and are arranged to be held in the lap like a writing tablet.

EXTENSION OF ELECTRIC TELEGRAPHING.—The overland telegraph has assumed mammoth proportions. There is in the United States alone a total of 807,589 miles of wire, enough of the attenuated metal to go around the equatorial belt of the globe 32 times. France has 241,800 miles of wire; Germany 186,733; Great Britain and Ireland 183,502; and Russia 172,360. In number of messages transmitted the United States leads with 80,000,000, followed by Great Britain with 57,765,347; France 22,341,000; Germany 17,782,323; Austria-Hungary, 13,240,642, and Russia 10,477,049. The following table exhibits the number of miles of lines, of wire, and number of messages transmitted in each country of the globe for the year indicated:

Countries.	Year.	Miles of Lines.	Miles of Wires.	Number of Messages.
Algeria.....	1888	7,000	16,000	
Argentine Republic.....	1889	14,700	28,550	3,511,430
Austria-Hungary.....	1888	38,159	111,532	13,240,642
Belgium.....	1889	4,013	19,090	7,266,694
Bolivia.....	1889	180		16,127
Brazil.....	1889	6,300	11,160	567,985
Bulgaria.....	1888	2,750		620,692
Canada.....	1889	29,460	61,219	4,064,381
Cape of Good Hope.....	1889	4,839		1,063,949
Chili.....	1889	10,640		572,333
Colombia.....	1888	2,800		
Costa Rica.....	1888	600		112,639
Costa.....	1889	2,810		
Denmark.....	1889	3,674	10,280	
Dutch East Indies.....	1887	6,556		396,366
Ecuador.....	1889	1,200		
Egypt.....	1889	3,172	5,423	666,869
France.....	1889	54,560	241,800	22,341,000
Germany.....	1888	57,763	186,733	17,782,323
Great Britain and Ireland.....	1889	30,726	183,502	57,765,347
Greece.....	1889	4,392	5,062	936,638
Guatemala.....	1888	1,223		457,009
Hawaii.....	1888	250		
Honduras.....	1889	1,800		
India, British.....	1888	31,894	98,517	2,807,617
Italy.....	1889	19,460	78,160	8,772,671
Japan.....	1888	6,164		2,564,514
Luxemburg.....	1889	1,653		
Mexico.....	1889	27,861		
Montenegro.....	1889	280	10,850	4,059,674
Netherlands.....	1889	3,100	22,219	3,410,417
New South Wales.....	1889	12,000	11,617	1,765,360
New Zealand.....	1889	4,992		
Nicaragua.....	1888	1,700		
Norway.....	1889	5,638	10,282	1,314,583
Orange Free State.....	1889	1,120		
Paraguay.....	1889	100		
Persia.....	1889	3,824	6,124	
Peru.....	1878	1,882		
Philippine Islands.....	1889	730		
Porto Rico.....	1889	470		
Portugal.....	1885	3,210	7,468	1,730,107
Queensland.....	1889	9,167	16,648	1,284,438
Roumania.....	1888	3,271	8,084	1,317,689
Russia.....	1888	88,280	172,360	10,477,049
Salvador.....	1888	1,440		
Servia.....	1889	1,810	3,060	471,126
Siam.....	1889	1,000		
South Australia.....	1889	5,509	11,448	
Spain.....	1887	11,512	28,870	3,549,860
Sweden.....	1889	5,120	13,346	1,430,481
Switzerland.....	1888	4,340	10,540	3,000,000
Tasmania.....	1889	1,894	2,505	271,769
Transvaal.....	1889	1,250		
Tunis.....	1889	2,000		
Turkey.....	1889	15,000		
United States.....	1890	254,110	807,589	80,000,000
Uruguay.....	1890	2,234		148,166
Venezuela.....	1888	3,000		408,514
Victoria.....	1889	4,194	10,360	2,743,538
Western Australia.....	1889	2,385	2,659	180,735
Total.....		842,812		

1889 was 31.2; in 1890 was 32.4. The average cost per message to the company in 1868 was 63.4; in 1889 was 22.4; in 1890 was 22.7. The number of messages annually transmitted throughout the world may be estimated at 300,000,000.

PROGRESS IN RAPID TELEGRAPHING.—In 1837 the first telegraph of Cook and Wheatstone transmitted messages at the rate of four words per minute, five wires being required; now six messages are conveyed by one wire on the Delaney multiplex apparatus at ten times that speed; and on the Wheatstone fast-speed apparatus 600 words per minute are transmitted on one wire.

TELEPHONE.—The history of the telephone is quite modern, although as early as 1850 the probability of speech being telegraphically transmitted was foreshadowed; and again in 1860, Reis succeeded in transmitting musical sounds and imperfect speech. It was reserved for Graham Bell, in 1876, completely to solve the problem, and for Edison a little later to perfect the same by the invention of the "carbon transmitter" (see Britannica, Vol. XXIII, pp. 127-135). An important advance has been made in telephony by the discovery that the use of copper, instead of iron wire, enabled the telephone to work to a practically unlimited distance, and long-distance telephone lines are being rapidly extended throughout the country.

According to the latest statistics made public by the American Bell Telephone Company, which practically monopolizes the telephone business in the United States, there were in 1890 in this country 757 exchanges, 471 branch offices, 192,610 miles of land wire, 603 miles of submarine cables, 156,780 circuits, and 185,003 subscribers. The number of instruments in the hands of licensees under rental at the beginning of 1890 was 444,861. The number of exchange connections daily in the United States is 1,240,147, or a total per year of over 400,000,000. The average number of daily calls per subscriber is 6.13. The company received in rental of telephones in 1889 \$2,657,361. It paid its stockholders in dividends during the same year, \$1,838,913. The Bell Company and its subsidiary companies represent about \$80,000,000 of capital; the Long-Distance Telephone Company about \$5,000,000.

ELECTRIC MOTORS.—Electric traction was first practically worked in 1879 by Dr. Werner Siemens, who constructed and started an electric tramway in the grounds of the Industrial Exhibition at Berlin. A train of three cars was placed upon the railway, which was 900 yards long. On the first car an electro-dynamic machine was so fixed as to cause one pair of wheels to rotate when the current passed through its coils. A middle rail, supported on insulating blocks of wood, ran between the working rails, and by this the current was led from the generating apparatus to the car. After passing through the electric motor, it passed by the wheels to the outer rails, and so back to the generating dynamo. Between twenty and thirty persons at a time could be accommodated on the train; and during the summer of that year 100,000 were carried over the line at a speed of from 15 to 20 miles an hour. The locomotive could exert 5-horse power, and was started and stopped by a commutator for closing and opening the circuit. Since then the progress of electric traction has been very rapid, and in the United States alone there were in 1891 over 200 electric railways, having a collective length of 1,750 miles, with 2,400 motor-cars traveling thereon.

In the present state of electrical science, however, electric motors cannot take the place of the steam

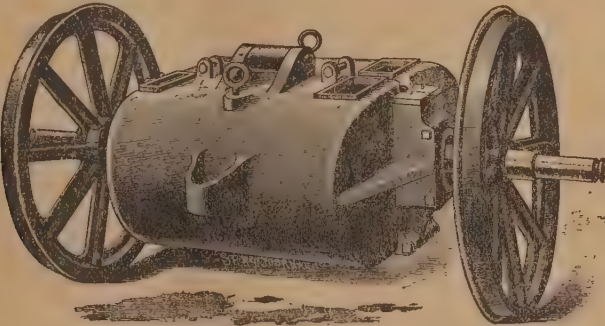
The Western Union Telegraph Company reports the average toll per message in 1868 was 104.7; in

engine for originating power. Given a supply of electricity, the motor can be used for all sorts of purposes, and can be applied to almost as many uses as a steam engine. But to obtain the electricity cheaply we must have power of some kind. There must be a waterfall, or a steam engine, a tide-mill or a wind-mill to produce the power in the first place. By this power a dynamo can be driven, and this gives the electricity for driving motors. Electricity is the driving power of the electric motor as steam is of the steam engine. As a consequence the motor's usefulness is limited to such places as are within the reach of an electric supply. By means of wires the electricity can be conveyed to motors over a distance of some miles from the generating station. The use of the electric motor cannot be considered applicable to all purposes until some means have been discovered whereby electricity may be produced from coal as directly as we now produce steam by burning coal beneath a boiler. At present we have first to produce power in order to generate electricity, then transmit it by wires to the motor which transforms the electricity again into power, and so does our work. The economy or the reason for this double transformation is found in the ease with which the transformation is accomplished. Instead of costly and cumbersome

shafting, belting or ropes, only moderate-sized wires are required. Instead of being limited to short distances and to fixed locations, the wires give great freedom for the change of location, and the distance covered may be several miles.

ELECTRIC STREET RAILWAYS.—In an able paper on this subject, read before the Society of Arts in Boston in 1889, Capt. Eugene Griffin, well known as an electrical expert of high authority, presented a mass of statistics showing the great progress already made in the use of electricity on street railways, accompanied by a great amount of information of practical interest and value, portions of which we condense as follows:

The dynamo or generator and the motor are theoretically the same. If a steam engine be belted to an armature pulley and the armature pulley be made to revolve, a current of electricity is passed through the machine, the armature is made to revolve, and by belting to the armature pulley, mechanical power is available. In this way one dynamo will convert the mechanical power of the steam engine into electrical power, and the electrical power may be carried through the wires to the second dynamo, perhaps five miles away, where it is reconverted into mechanical power, and so made available for any desired purpose. The second dynamo is called the motor, and differs from the first, not in principle, but only in details, which make it better suited for its special work. In this way we do away with the zinc fuel and come back to coal, except in those places where we are fortunate enough to have water power.



WESTINGHOUSE IRONCLAD GEARLESS MOTOR.

A brief description of the dynamo or generator and the motor is essential to a proper understanding of this subject.

The modern dynamo electric machine is simply an application on a larger scale of Professor Faraday's discovery that if a wire be moved through the magnetic field of a permanent electro-magnet, a current of electricity is produced in that wire. A dynamo machine consists of a pair of field magnets, between whose poles or extremities revolves a soft iron rotating support, wound about with a series of coils of wire in which the current is developed. The revolving body is called the armature. It is generally made to revolve by belting a steam engine to a pulley on the armature shaft. As each wire moves through the magnetic field of one pole of the magnet, the induced or generated current in the wire is in one direction; as the wire moves through the field of the other magnet pole, the current is in the opposite direction. The current taken from the poles of the machine or generator, as it is usually called, would therefore be alternating, were it not for the device called a commutator.

This consists of a copper cylinder on the armature shaft, divided into as many segments as there are separate coils of wire in the armature, each segment insulated electrically from the others and connected with its own armature coil. This commutator revolves with the armature, and against it are pressed two copper brushes, as they are called, which do not revolve.

These brushes are the current collectors, and when they are connected by a metallic wire five inches or ten miles long, so as to close the circuit, a direct current flows through this wire as long as the armature is made to revolve. Without going into details, it is sufficient to say that the brushes are so placed that as each segment of the commutator comes in contact with the brush, the induced current in the corresponding wire is flowing in a constant direction, so we have a direct instead of an alternating current. As a matter of fact the armature is not made up of separate coils; but the

connections are so made with the commutator segments that we may theoretically regard the coils as separate.

The motor is practically the same as the generator, except that the power applied is electrical energy and the power obtained is mechanical. The current coming from the generator goes to the brushes on the motor, thence to a segment of the commutator and so to the armature coils. The wire with a current flowing through it in a given direction is repelled by one pole and attracted by the other. The powers of attraction and repulsion compel the armature to move; it revolves and we have mechanical energy. We gear the armature to the car axle and we have motion.

There are two general methods of using electricity for the propulsion of street cars:

1. The direct method by conductors extending from the dynamo along the track.
2. The indirect method, by the use of storage batteries secondary batteries, or accumulators.

In the direct method the conductors may be overhead, underground, or on the surface. In the conduit system the conductors are placed in a conduit between the rails or between the tracks. The wires must be bare and yet must be thoroughly insulated from the ground, a condition very difficult to obtain under circumstances. A slot about five-eighths of an inch wide gives access to the conductors by means of a contact plow, but unfortunately also permits the flow of water, slush, mud, etc., into the conduit.

The overhead wire is suspended from poles by brackets or from cross-wires which span the street between poles on either side. When the street is of sufficient width, poles are placed in the center of the street between the two tracks, with bracket arms carrying the conducting wires. These poles are placed about 125 feet apart, and from actual experience are found to present little or no obstruction to traffic. The wires may be single or double. When single wire is

used, the rails are utilized for the return current. When two wires are used, one wire carries the outgoing and one the return current. Contact is obtained with the wire by an over-running or an under-running trolley. The over-running trolley is a light carriage with one or more wheels resting on the wire.

A flexible conductor carries the current down to the car. The trolley is pulled along by the flexible conductor. The objections to the over-running trolley are that it is difficult to keep the trolley on the wire, it is difficult to replace the trolley when it comes off, and any automatic system of switching on to a turnout, branch, or Y is impossible. The latter is such a serious objection that except in special cases the over-running trolley will never be used. In the under-running trolley a light arm of the requisite length is mounted on the top of the car, reaching up to the wire. A wheel on the end of the arm is pressed up against the wire by means of springs at the other end, and the current is car-

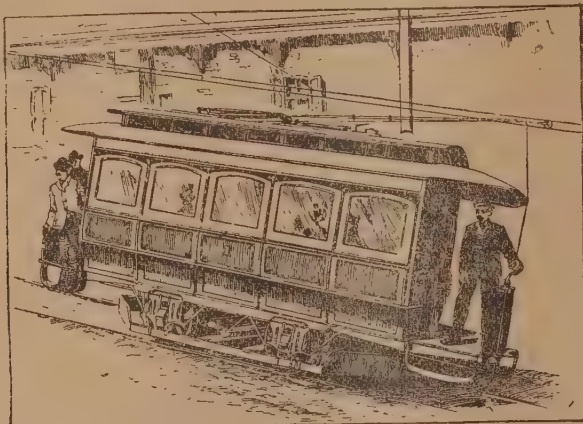
ried from the wheel down through the arm itself if made of metal or through wires if the arm is made of wood. This arm is usually called the contact bar. The under-running trolley is automatic in its action at curves, turnouts, etc., and follows the direction of the car. It turns on a swivel through the entire circle, and moves through an arc of 90° in a vertical direction.

In the storage system, a battery of about 120 cells is carried on the car, and the motors are driven by the current from this battery. The advantages of this system are:

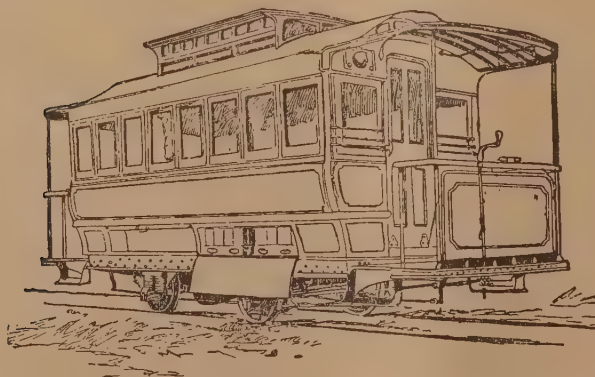
1. The cars can run on any track.
2. No wires, either overhead or underground, are required.
3. Each car is more independent than is the case in other systems.

The disadvantages are:

1. The extra weight of about two tons on each car. The power required to carry this dead weight in addition to that required to drive cars required by the other methods.



ELECTRIC CAR ON A 10 PER CENT. GRADE.



JULIEN CAR PROPELLED BY STORAGE BATTERIES.

2. The lack of efficiency in the batteries. The highest efficiency claimed is 82 per cent. The actual practical efficiency is stated by many authorities as about 70 per cent.

3. Storage cars cannot be regularly operated on grades exceeding 5 per cent. or 6 per cent. The power required on grades makes too great a demand on the batteries.

4. The expense. The cost of two sets of batteries per car is about \$3,000.

5. The cost of maintenance. Batteries have not yet been made of sufficient durability to be operated economically.

There are four qualities which the electric motor must be shown to possess before it will be generally adopted for street-car work. These are efficiency, economy, durability, and reliability.

1. As to efficiency: The steam engine is not an efficient machine. If we can utilize 15 per cent. of the units of energy stored in the coal, we are fortunate. In other words, we must expect a loss of 85 per cent. of the heat units in converting the other 15 per cent. into mechanical power.

The dynamo electric machine, on the other hand, possesses a high degree of efficiency. No good generator runs below 92 per cent. efficiency. The loss in the line depends upon the amount of copper used in proportion to the current to be carried. The size of the conductor is generally calculated for a loss of 10 per cent. The efficiency of the motor under favorable circumstances has been shown to be but little below the generator; in actual tests running as high as 91½ per cent.

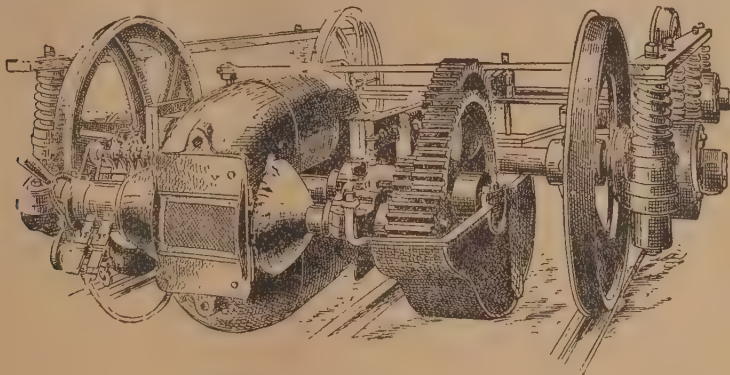
In practice it would not probably be taken higher than 85 per cent. Starting, then, with 100 horse-power in the steam engine, we lose 8 per cent. in the dynamo in converting the mechanical into electrical energy. The output of the generator is then 92 horse-power. In the line we lose 10 per cent. and deliver 82.8 horse-power to the motor. Here we lose 15 per cent., and on the final reconversion into mechanical energy on the car we have 70.4 horse-power out of the original 100 horse-power. By no other known method could this power be transported to such a distance with so little loss.

2. Economy: This is perhaps a quality which appeals more directly to the railway official than any other. What will it cost? An electric railway connects Omaha with Council Bluffs across the new bridge. I am credibly informed that to run 20 cars per day they consume five tons of slack, for which they pay \$1.14 per ton. This is 28½ cents per day for fuel. These cars are scheduled at 15 miles per hour, and the average daily mileage per car is over 100 miles. Where natural gas or water is available, fuel may be even cheaper. On many different roads from numerous measurements it has been found that where the grades are slight the power required averages from five to eight horse-power per car. The consumption of fuel varies from three to six pounds of coal per horse-power, according to the style of engine and its more or less economical operation. Of course a road operating only one or two cars would show abnormal results in every way, and these averages are only true of roads operating a number of cars—10 or more. The wear and tear on the generating plant does not exceed three per cent. The depreciation on line work does not exceed or even equal 10 per cent. The depreciation on car equipment has been variously estimated at from 10 to 20 per cent.

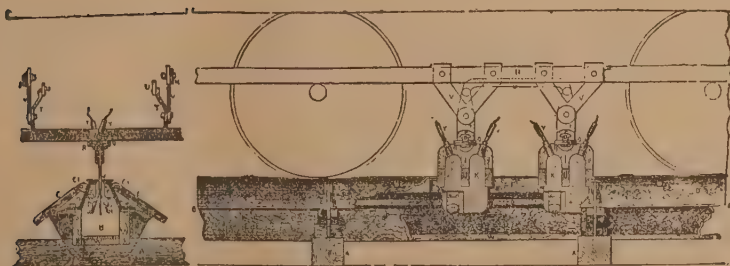
On some roads, under very favorable conditions, the cost of renewals and repairs to electrical apparatus has been but little below one dollar per day per car in actual operation. On other roads, under very favorable conditions, the cost of maintenance has been less than 25 cents per day per car.

A mean of the reports obtained from 11 roads in actual operation under different conditions shows a daily cost of operation of less than \$2.50 per car, not including drivers and conductors. Experience has shown that it is well within limits to put the saving of electric over horse power at 25 per cent. In some cases a saving of 50 per cent. has been shown. The secretary of the Des Moines Broad Gauge Railway Company, under date of January 8, 1889, writes as follows: "The receipts from four cars electrically are four times more than five cars by horses."

3. Durability: The Washington road has been in operation for over six months. They now have seven motor cars and seven tow cars. The latter are double-deck cars, on which 160 fares have been collected on one trip. These cars are hauled around sharp curves and up a five per cent. grade by two 10-horse-power motors. While the track was new it settled. A car left the track, and while it was being pried back



THE BENTLEY-KNIGHT TRUCK AND CONDUIT.



PLOUGH, CONTACT SHOES, AND CONDUIT.

one of the motors was injured mechanically. With this exception not a single armature or field has been burned, and the gears show but trifling signs of wear. The road has operated without any repair shop, and practically without any repairs up to the present time.

At Lynn, Mass., a single car has been in daily operation since November 9 of last year. It runs 93 miles per day, and the 1.7 miles of track contains 11 curves and numerous grades ranging up to a maximum of 12 per cent. The durability of the electrical apparatus under such unusual conditions has been remarkable.

4. Reliability: On the Lynn road, above referred to, the single car has made its daily trips with but very few departures from the schedule. On one occasion the car axle broke, due to a flaw in the metal. On another occasion the belt slipped from the engine at the power station. Since the middle of February not a scheduled trip has been lost from any cause whatever, nor has the car failed to run on time. No one can look at the daily record of this car under conditions which would prevent horse-car work, and doubt the reliability of electrical apparatus. On the Cambridge line of the West End road the conditions are unusually bad. During the month ending April 19, the schedule called for 5,912

round car trips. Of these the electrical cars failed to make just four trips.

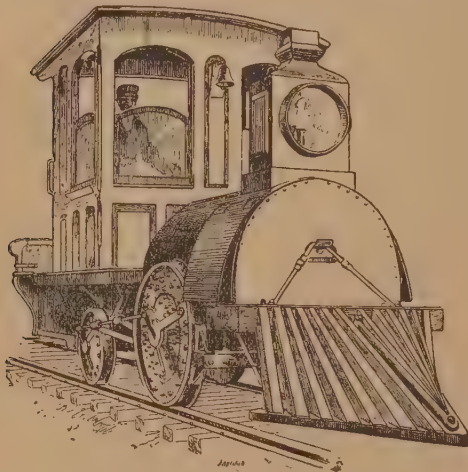
As the railway employees become more familiar with electrical apparatus and learn more of the details of handling the cars, accidents, mishaps, and lost trips will grow fewer and fewer; but the records above referred to suffice to prove the reliability of the electric motor.

Storage battery cars are in operation on one road in the United States—the Fourth Avenue line in New York city. Conduits have been built in several places, in San José, Cal., and in Denver, Col., they were complete failures. In Allegheny City, Pa., the conduit has operated with considerable success. In Boston it has not been a marked success. There are at the present time over 100 roads in operation or under contract where the overhead wire system is to be employed. From this we may infer that the storage battery and conduit are yet in an experimental stage, while the overhead wire is a pronounced and demonstrated success. What the future of storage batteries and conduits may be no one can tell; but we all hope that the difficulties encountered may be overcome, as the storage system is unquestionably the ideal system.

The objections usually urged against the overhead wires are:

1. They are dangerous, as they carry death-dealing currents.
2. They are eyesores.
3. The poles obstruct the street.
4. They are in the way in case of fires.

Now, the railway wire should not be confounded with other electric wires. Arc and incandescent wires, telegraph and telephone wires, have simply to carry the current from the point where it is generated to the point where it is to be used, and so far as this purpose is concerned they may be above ground or under ground. The railway wire, on the other hand, must have current taken from it every differential of an inch from one end to the other. The wire must be bare that the trolley wheel may be in constant contact. To put this wire underground and to keep it properly insulated is a very different problem from burying the other wires. The railway wire cannot be considered in the same category with other electric wires. Now, as to danger. For railway work we use a constant potential generator, and the cars and motors are placed between the two conductors on the multiple-arc system. One conductor, the overhead wire, runs out from one pole of the generator; the other conductor, the rail, runs out from the other pole of the generator. An electrical connection between these two conductors completes the circuit, and the current flows through the connecting material, whatever it may be. If it be the motors on a car, then the cars move; if it be a man, he receives a shock.



THE IMPROVED EDISON LOCOMOTIVE.

Each connecting material, be it car, man, wire or whatever, receives a current of electricity which is absolutely and always determined by Ohm's law that the current is equal to the electro-motive force or pressure divided by the resistance. The electro-motive force is always 500 volts. With several cars in operation, the amperes of current in the overhead system near the generator may run as high as 181, but each car takes its own proportion according to its resistance. The average resistance of a man is 4,000 ohms. If he places himself in the circuit, he will receive a current which is measured in amperes by dividing 500 by 4,000, or, in other words, a 500-volt current can only drive $\frac{1}{8}$ of an ampere through the average human body. It would not make a particle of difference to the man whether the overhead wire he touched was carrying a current of 1 ampere, or 180 amperes, or 180,000 amperes. The effect in his case would be the same; he would receive $\frac{1}{8}$ of an ampere. Were this not true, then the whole multiple arc theory would be false, and electric railways, as at present operated, would be impossibilities. It would then make no difference as to danger whether one or a million cars were in operation on the line.

To make this matter plain to those unfamiliar with electrical terms, we may suppose the overhead wire to be a large pipe or main through which a pump (the generator) is forcing water; the rails, electrically connected, as another large pipe through which the water is to be forced back to the station. Suppose the diameter of these mains is 12 inches. If they are closed at the outer ends, we may fill the overhead main, but after that no water can flow until we connect the two pipes. Now we will put in a one-inch pipe connecting the upper main with the lower main, say 1,000 feet from the pump or generator. A certain amount of water will flow through the connecting pipe, which amount depends upon its size—one inch—and upon the pressure of the water in the upper main. From the generator to the one-inch connecting-pipe the same amount of water flows in the upper main as flows down through the connection, no more and no

less. Beyond the connecting-pipe, no water is flowing in the upper main.

Now we will put in a second connecting pipe 1,000 feet beyond the first. For the first 1,000 feet we have twice as much water flowing as before. Half of it goes down through the first pipe. It is the same with every additional connecting pipe we put in until we reach the capacity of the upper main or the capacity of the generator to force water through it. By increasing the pressure, we know that we could force more water through the one inch connecting pipe; but so long as the pressure remains the same, the quantity flowing through the inch pipe will be the same, whether the upper main be 12 inches, 12 feet, or 1,000 feet in diameter.

The analogy to electric railway work is close. Electricity takes the place of the water and the connecting pipes are electric cars, or it may be some unfortunate man placed where he had not ought to be. He is only an inch pipe, however, and the pressure (500 volts) can only drive so much electricity through him.

The current for railway work has been fixed at 500 volts, as this is well within the safe limits. A shock from 500 volts is unpleasant, but not dangerous. No man, woman or child has ever been killed or even seriously injured by a 500-volt current. The United States Senate has on this question before them last summer. After a thorough investigation the District committee unanimously reported that a 500-volt current is not dangerous. If there were any real question of its being dangerous, we should use 400 volts or 300 volts. The objection to this, however, is that by reducing the voltage we must correspondingly increase the quantity in order to retain the same horse power, and an increase in quantity (amperes) means an increase in the size of the overhead wires, which is objectionable. The danger limit with the electric current is probably about 1,000 to 1,200 volts.

The poles cannot obstruct the street, as they are inside the curb. They are just as much of an obstruction to the sidewalk as lamp posts and awning posts are—no more and no less. If the sidewalks be narrow and permission can be obtained from the property owners, hooks or eyebolts may be placed on the buildings, the cross-wires fastened to these, and the poles done away with entirely.

Every overhead wire is objectionable to the fire commissioners; the railway wire is less objectionable than any other, because there is but one wire, and this wire is in the middle of the street, away from the buildings.

If the single overhead working conductor is insufficient to carry the current necessary to operate the cars, it must be reinforced by feeder wires. These feeder wires may be insulated and may be placed underground. The overhead wire may be divided into sections of three, four, six, or 1,000 feet in length. At the ends of each section a cut-out or switch may be placed on the pole like a fire-alarm box, so that in case of fire the current may be cut out of the section or sections in the vicinity of the fire. The firemen would then have no difficulty in handling the wires, which in any event are easily cut by pliers with insulated handle. As ladders are usually raised parallel to the face of the building, rather than across the street, and as the cross-wires are 125 feet apart, it would be a very rare thing that the railway wires would be found to interfere at all with the operations of the fire department. As Prof. Thomson pertinently remarked to the insurance representative: "It will not be long before you will be taking power from these wires to put out your fires. It will not be long before we have electric motor fire engines."

Charles J. Van Depoele and Leo Daft were the pioneers in the modern electric railway work in this country.

The first roads were built in 1884-85. The new motive power was, however, viewed with suspicion, and progress was slow until the Richmond road was built by the Sprague Company in 1887-88. This road did much to popularize electric motors. The rapidity with which the horse is now going is shown by the growth of the railway business of the Thomson-Houston Electric Company, one of the several companies working in this field. In the spring of 1888 this company purchased the patents of the Van Depoele Electric Company, of Chicago. At that time there were some 14 roads operating under the Van Depoele electric system. The first Thomson-Houston car was started at Crescent Beach, Me., July 4, 1888. On the 1st of April, 1889, in less than nine months, there were 18 roads with 104 motor cars in operation, and 33 roads with 210 motor cars under contract. The Americans are essentially a fast people. We live fast, and, unfortunately, we die fast. But as long as we do live, we go. Any time-saving device is gladly welcomed, and at once becomes popular. The limit of speed with horse cars is about eight miles per hour. With electricity the only limit is the one we may fix as a safe speed. If horse cars are delayed, there is little or no chance of making up lost time. The reverse is true of electricity. With electricity we have rapid transit, and we can obtain it in a very simple and not too expensive way. Electric motor cars do not smoke or give off noxious gases or make disagreeable noises. It is not necessary to run them in the air or over the ground, though they would run well in either position. They are safe, clean, fast, and reliable. They do not keep the street in an unclean and unhealthy condition. They do not take up as much of the street as do horse cars, for they have no horses. They are brilliantly lighted at night.

All of these qualities appeal to the public, and the verdict everywhere is favorable to electricity. The United States

Senate and House of Representatives in reporting on a proposed extension of the Washington road, said: "It is undoubtedly the best electric railway in the United States, and beyond comparison superior to any horse railway."

To obtain these advantages the public must aid the railways. The rails must be of sufficient weight and of such form as to best carry the increased weight and stand the increased speed. Some form of girder rail weighing not less than 45 pounds to the yard is best suited to this work. The rail must be so placed as to be easily kept clean, and for this purpose should be slightly elevated above the surface of the street.

On the part of the railway companies, while the first cost is great, they can look forward to reduced operating expenses, a greater car mileage per day, and a great increase of traffic. Electricity has undoubtedly come to stay.

TELPHERAGE—Is a special application of electric energy to traction for the conveyance of minerals and goods over a rough district, where the cost of railways is too great for practical use. A telpher line crosses rivers, roads, bridges, and valleys; and even when the whole of the line is erected over a territory continually rising, the telpher locomotive can easily be made to draw loads up gradients which cannot be done on an ordinary railway. Ingenious means have been invented and practically applied to cause a telpher train to travel automatically, without any driver to control it. When properly equipped a telpher train proceeds along the level and ascends or descends gradients at about the same speed. It is the great point in telpherage that the loads should be small, and that the trains should follow each other rapidly. Among the more recent telpher lines which have been made for the carriage of minerals is one at the Eastpool tin mine in Cornwall, England, over a mile and a quarter in length, for the transport of 1,000 tons of tin ore per week.

ELECTRICAL TRANSMISSION OF POWER.—One of the most important applications of electricity to industrial purposes which the modern development of the electric light has led to is the electrical transmission of power. Siemens a few years ago pointed out that no further loss of power was involved in the transformation of electrical into mechanical energy than is due to friction and to the heating of the conducting wires by the resistance they oppose. This loss, careful researches have demonstrated, need not be more than 13 per cent., provided there is no loss in the connecting leads. The Paris Electrical Exposition of 1881 afforded interesting illustrations of the performance of a variety of work by power electrically transmitted, including a short line of railway constructed by the firm of Siemens, which was a further development of the successful result already attained in Berlin by Werner Siemens in the same direction, and was in turn surpassed by the considerably longer line worked by Messrs. Siemens at the Vienna Exhibition two years later.

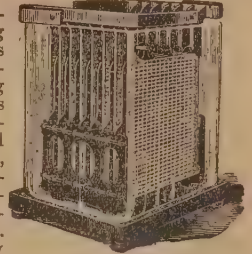


ELECTRIC PERCUSSION DRILL.

A further development of the electrical transmission of energy is to take place in the utilization of the power of Niagara, and a large tract of land about a mile distant from the falls has been acquired for the purpose, with the view of erecting mills for utilizing the power, which it is proposed to transmit to distant towns. An International

Commission has been formed, which will carefully consider the problems involved in the execution of this grand scheme.

STORAGE BATTERIES, OR ACCUMULATORS.—The problem how to save and store up the enormous amount of natural energy which is daily dissipated in producing natural phenomena has long occupied the attention of scientists. During the last few years this attention has been especially directed toward electricity as an agent, and the result of experiments has been the development of the electrical storage batteries, or accumulators, as they are sometimes called.



ELECTRICAL ACCUMULATOR.

In an interesting article on this subject, published in the "Popular Science Monthly" for January, 1891, Prof. Samuel Sheldon states that the employment of these names for the apparatus is very unfortunate. They are the cause of the popular idea that electricity, which is considered as a subtle, indefinite, and intangible something, is stored up in them, as valuables are stored in a vault. The commercial current electricity cannot, in large quantities, be stored and still preserve its character. It has but a fitting existence, and is no sooner produced than it dissipates itself, and is converted into some other form of energy. The energy which a current may at any instant be said to possess is immediately transformed into heat in the circuit, which will under certain conditions produce light; into chemical energy; into motion, which may or may not produce sound; or into magnetic and electrotonic conditions. The last may either be permanent or have the same evanescent existence as the original current.

When electricity is employed to charge a storage battery, only that part which is transformed into chemical energy is used. The rest is dissipated. The battery, then, instead of being a place where electricity is laid away, is a place where chemicals are left by the current, with the expectation that they will in turn produce a current when called upon. This may seem a fine distinction, but it is only apparently so. For instance, the current might be produced by a dynamo turned by Niagara water-power. The chemical left by it might be zinc deposited from a solution of zinc sulphate. This might be transported, preserved, bought and sold, and finally be employed by some physicist to produce another current. To understand this transformation more clearly, and to obtain a clear idea of what goes on in a storage battery, one must first become acquainted with that part of electricity which treats of the phenomena resulting when a current of electricity passes through a liquid. This is called electrolysis, and the liquid through which a current can be made to pass is called an electrolyte. If a current of electricity flows into a liquid solution of any metallic salt by means of a wire, and if, after traversing it, it flows out through another wire, then it will, by its passage, separate the salt into two parts and deposit the metal upon the latter wire. If, for instance, the solution be one of silver cyanide, then silver will be deposited on the second wire. If a brass fork be connected with this wire and dipped in the solution, it will receive a coating of silver by the process and will be silver-plated. Substitute a solution

of nickel nitrate, and the article would become nickel-plated. By using copper sulphate, the faces of types and cuts are coated with copper, which increases their hardness, and consequently their endurance.

The simplest storage battery, then, would seem to be one constructed of two copper plates suspended in a solution of some zinc salt. A current of electricity passed into this would deposit zinc upon one of the plates. After disconnecting the charging current, the battery of itself would give off a current until the zinc was redissolved.

It might be well, right here, to define a primary battery. If any two different metals be dipped in an

acidulated liquid, and if their external extremities be connected by wire a current of electricity will flow through the wire. Such a combination is called a primary battery. Under the same conditions the amount of electricity obtained depends upon the character of the metals. If nickel and iron were employed, a small amount of electricity would result. If, however, zinc be used in connection with either silver, gold, platinum, carbon, or copper, a large amount is obtained. The

first three of the group are very expensive; hence, in most primary batteries, we find zinc combined with either carbon or copper, the differences between the various forms arising from difference in the liquids employed, or in the shape of construction. Furthermore, pieces of the same metal under different physical conditions, when combined with each other, will give a current. For instance, a piece of polished iron opposed to a rusty piece gives a current; and a plate of very rusty lead, if we may use the expression, combined with a piece of bright lead, yields even more current than zinc or carbon. Unfortunately, lead does not rust sufficiently well to suit electricians, and other physical reasons prevent its being used in primary batteries. It will thus be seen that a storage battery, when once charged, becomes nothing more or less than a primary battery. In the case before described, after charging, we have zinc and copper in a solution of zinc sulphate.

In describing the effects of electricity in passing through an electrolyte, we have assumed that the liquid contained a metal in solution. Suppose, now, that we take water, which has no metal in it, and subject it to the action of the current. The electricity can get no metal to deposit on the wire, where it passes out, and in consequence does the next best thing, and leaves one of the components of the water—namely, hydrogen gas. The other component, oxygen, collects around the entrance wire. The English physicist, Grove, showed that if these two wires, around which the gases had collected, were connected together, a current of electricity would flow the same as if there were two metals instead of two gases. Now, water is cheap, and if there were not some serious difficulties as regards efficiency, Grove's battery would be universally employed. It was reserved, however, for M. Gaston Planté to construct the first practical secondary battery. He considered the following points in its construction: Water is cheap; water, when subjected to the electric current, gives off oxygen and hydrogen; rusty lead, when combined

with bright lead, has a high electro-motive force; oxygen makes lead rusty, and hydrogen makes it bright. His battery consisted, then, of two lead plates suspended in water, which contained a little sulphuric acid to assist in the conduction. When a current of electricity was passed through, hydrogen was thrown off at one plate, making it bright, and oxygen at the other plate, peroxidizing its surface. When the charging source was removed, the altered plates would send off a current which was in a direction opposite to the one which had charged them, and this would keep until the plates had assumed their original condition. Planté's choice of materials was most wise, and all practical storage batteries of to-day are but modifications of this style. In order that his battery might give a strong current, and one that would last a long time, it was found necessary that his two lead plates should be as near to each other, and that they should be as large as possible. He accomplished both of these ends with economy of space by winding large plates into a spiral form, they being separated from each other by strips of rubber.

In charging this battery, care must be exercised that the current be not too strong; otherwise the gases would be sent off too rapidly for the lead to take them up, and they would then rise to the top of the liquid and escape into the air. The electrical energy which separated them would thus be lost. It accordingly takes a long time to charge a new Planté battery to its full capacity. After being subjected to the current for a day or two, it will be found that the plate which received the oxygen has changed its physical character; instead of having a smooth surface, it presents a spongy appearance, having little holes and cavities in it, and thus exposes a larger superficial area. If the battery be now discharged, and be again subjected to the charging current, it will be found that a much stronger current may be used than at first, without any gas escaping. This is owing to the much larger surface exposed and to its spongy character. This original charging of a new battery, to change the character of the lead surfaces, has been termed *formation*, and, inasmuch as only one plate is altered by a charge in one direction, a complete formation consists in a charging in two directions.

From what has been said it will be seen that the electricity which is used for charging an accumulator is apparently used in the production of oxygen and hydrogen gases. These are made to oxidize one plate and clean up the other. Now, an interesting question arises, whether it would not be more economical to employ gases, which can be more cheaply produced through chemical means. Difficulties, however, arise here; for the oxygen of electrolysis is generated in the form of nascent oxygen, which is far more active than ordinary oxygen. A molecule of the ordinary gas contains two elementary atoms, which work upon each other; with the electrolytic generation, however, a single atom is sent off, and this is chemically very active. It is sometimes called ozone; but chemists say that a molecule of ozone contains three atoms. Now, there is no known method of chemically manufacturing ozone in large quantities, and ordinary oxygen does not produce the desired effect. Again, Planté's supposition that the charging current produced these two gases only, is incorrect. The sulphuric acid in the water, which he supposed only assisted in the conduction, really acts upon the lead in forming lead sulphate. This has its use in preventing the charged battery from running down when not in use, and from too rapidly expending itself when put to use.



PRIMARY BATTERY.

The storage battery is susceptible of many improvements, chiefly in respect of increasing its durability. A more perfect system is much to be desired. The advance made in the past few years in this direction has been encouraging, and to prophecy that a practicable system will be produced before the world is many years older (in fact, in dealing with electricity, whose development is so rapid, we might say months instead of years), is to make a very safe prophecy indeed, as the entire history of electrical and mechanical invention points to such a conclusion.

POLICE AND FIRE ALARM SYSTEMS.—In the police and fire alarm signaling system in use in Boston, Mass., and several other cities, numbered signal boxes, containing telephones and automatic signaling instruments, are placed on every patrolman's beat, and are electrically connected with the

police station. From them the patrolman can either telephone or automatically transmit messages to the station, or the station house can signal the patrolman. Citizens can also summon police assistance from any signal box. The signaling system consists of three distinct and non-interfering methods of communications: namely, automatic and manual signaling from the street stations to the station house, automatic and manual signaling from the station house to the street stations, and telephonic communication between the street stations and the station house and *vice versa*. These are arranged to operate over a single metallic circuit. The signaling from the street stations to the station house is further divided into two classes: alarm signals, comprising signals directing the station house to send a patrol wagon or ambulance, or to use the telephone; and "patrol" or "on duty"

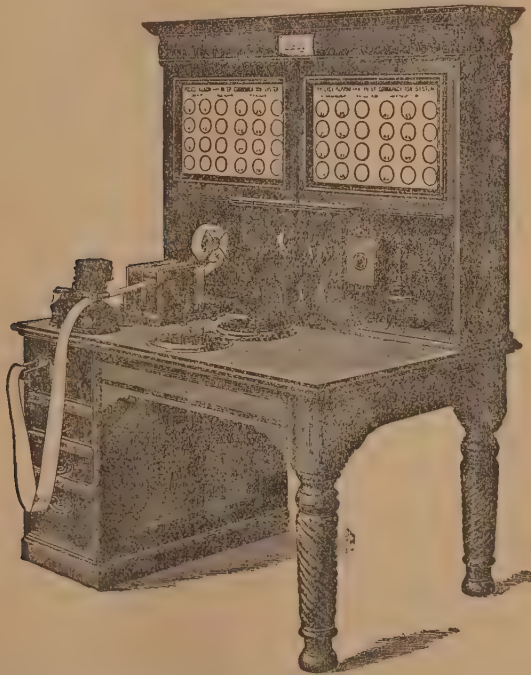


Fig. 1.—POLICE AND SIGNAL SYSTEM.—STATION HOUSE DESK, SHOWING REGISTER, TIME-STAMP, ETC.

signals, which indicate at the station house the movement of the patrolmen over the territory under their charge. The signaling from the station house to the street station is accomplished by the use of currents of electricity of a different character from those employed to signal from the street station to the station house, and they sound a bell in the street station to indicate the reception by the station house of an alarm signal, or to announce to the patrolman that the station house desires to speak to him by telephone. The telephones are inductively connected with the circuit, and they are so arranged, with relation to the signaling part of the system, that conversation may be carried on between two or more points, signals may be sent from a street station to the station house, and

from the latter to the former, all simultaneously over a single wire without interference or confusion.

Figure 1 illustrates the station house desk, showing register, electric time-stamp, etc. Figure 2 shows a signal box in position to be operated with a citizen's key. Figure 4 shows a signal box with the door open, while Figure 3 shows the stable apparatus for patrol-wagon service. When the door of the signal box is open (Fig. 4), a large dial and pointer, the automatic signal pull cooperating therewith, a telephonic receiver and transmitter, are exposed to view. Upon the dial are inscribed the alarm signals as desired. Upon the inside of the dial is mounted the signaling mechanism, including a gong to receive and sound the signal sent from the station house. By turning the pointer to

the service required and operating it by the pull, any one of the inscribed signals may be automatically transmitted. A push button is also provided to communicate with the station when a connecting wire is broken. A call for the patrol-wagon may be sent from the outside with the door closed, by simply inserting a key, termed the "citizen's key," into a key-hole at the front of the box and turning it as far as it will go. This key cannot be withdrawn until the door is opened. A master-key is carried by each patrolman. The boxes are made of iron, very strong and substantial. The pointer may be turned to the right or left, and the act of closing the door always sets it back to the zero or starting-point. The receiving cabinet to be used at the station house (Fig. 1) is carefully constructed and wired, and serves as a very convenient operating table. The signals received from



Fig. 2.—SIGNAL BOX.—IN POSITION TO BE OPERATED WITH "CITIZEN'S" KEY.

the street stations are recorded in ink automatically upon a paper tape, which also receives the impression of an automatic time and date stamp, so as to mark upon the tape the exact time at which each signal is received.

CAPITAL PUNISHMENT BY ELECTRICITY.—Of all the potent forces capable of producing death, there is none known to science more nearly instantaneous than electricity. In the ordinary occurrence in nature, where a person struck by lightning falls dead, nothing can be more sudden or rapid. And where electricity is generated artificially for illuminating purposes, the interruption of the alternating current by the intervention of or contact with any portion of the human body is invariably followed by the most serious consequences to the latter. Numerous cases of accidental death by such contacts have been recorded during the

past few years, and in every case the action of the current was so instantaneous as to leave not the shadow of a doubt that death was literally quicker than thought. The body was not mutilated; there were no indications of any death-struggle; none of physical pain. Respiration and heart-action instantly ceased, and electricity, with a velocity equaling that of light, destroyed life before nerve-sensation, at a speed of only one hundred and eighty feet per second, could reach the brain.

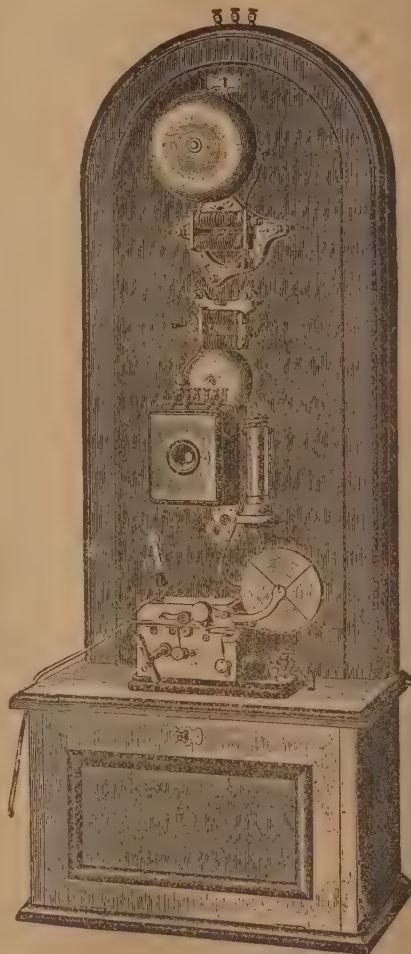


Fig. 4.—STABLE APPARATUS, FOR PATROL WAGON SERVICE.

Recognizing the advantages of electricity as a death-dealing agent, the legislature of the State of New York in 1888 amended its Code of Criminal Procedure by substituting for the death penalty by hanging the "causing to pass through the body of the convict a current of electricity of sufficient intensity to cause death; and the application of such current must be continued until such convict is dead." The first "electrocution" under this provision of the law took place in the State-prison at Auburn, N. Y., Aug. 6, 1890. After a few preliminaries the victim, William Kemmler, was

seated in a large oak chair, and securely confined with straps. An electrode, formed of a rubber cup containing a sponge wet with sodium chloride, was pressed down upon a spot upon the murderer's head, from which the hair had been closely cropped. The other electrode was similar in construction, but was attached to a stiff spring, which projected upward from the seat of the chair. This was placed in contact with the bared skin at the base of the spine. The warden gave a pre-arranged signal to an assistant stationed at the switchboard in an adjoining room, who turned the switch and closed the circuit. There was a sudden momentary convulsion of the victim, and apparently all was over. Death appeared to be instantaneous and painless. In 17 seconds the current was turned off,

and the body at once collapsed. A moment later, however, Kemmler gave signs of life, and the current was turned on a second time, the circuit remaining closed for a period of about four minutes, and until smoke was noticed curling upward from the two points of contact, and the pungent and sickening odor of burning hair and flesh pervaded the room. When the current was finally shut off, and the straps removed, the body collapsed and sunk in a heap on the chair.

The facts regarding this first execution were so surrounded with secrecy, prejudice and interest, that it is difficult to arrive at a true understanding of the actual condition of affairs. The physicians in attendance disagree as to whether Kemmler was killed by the first or second shock. They agree

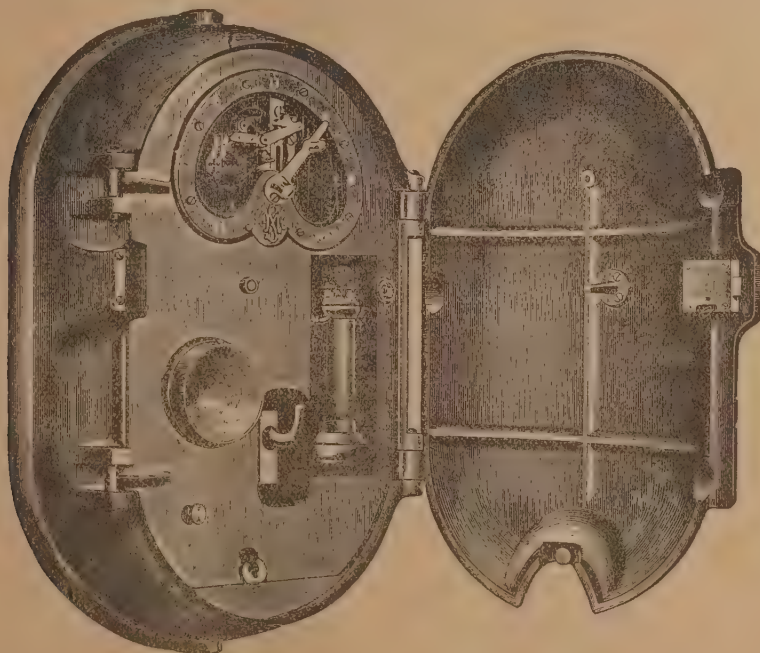


Fig. 4.—SIGNAL BOX.—DOOR OPEN READY FOR OPERATION.

only that he was unconscious from the instant the fatal current first touched him, and hence that his death was painless, if not instantaneous.

TEMPERING STEEL WITH ELECTRICITY.—An interesting application of electricity to the arts consists of tempering watch-springs by means of the electric current. A one-light dynamo is connected with an ordinary oil-tempering bath. One of the conductors connects with a point within the oil-bath, and the other with a point without. The piece of flat, soft steel wire that is to be tempered to the blue color is fed under the contact-point on the outside of the bath first, and then under the one on the inside. When it reaches the latter the circuit is complete, and the steel ribbon immediately and uniformly becomes heated. No means have been devised to measure the current exactly for the purpose of doing the work mechanically. The variation in the percentage of carbon in different pieces of steel forbids the delicate process of

tempering from becoming a purely mechanical piece of work. Therefore, with the electric current as with a fire, the color of the steel determines the length of time that it shall be heated. This process of tempering has several advantages. The chief one is, that the steel does not have time to oxidize, after it has been heated to the proper color, before it is under cover of the oil, and consequently that the steel ribbon is of the same thickness as it was before it entered the process. The heating is uniform throughout the length of the spring, and there is less liability of defective spots. The process is a rapid one, the springs being heated and passing into the bath at the rate of four inches per second.

REDUCTION OF ORES.—One of the most important of the recent industrial applications of electricity is the reduction of refractory metallic ores by a method based upon the resistance of a mass of carbon to the electric current. The furnace is built

of fire-bricks, and is rectangular in shape. Two carbon electrodes similar to those used in arc lights, are passed through opposite walls of the furnace. The ore of the metal intended for reduction is mixed with coarsely pulverized gas carbon, and formed into a sort of long core, the ends of which are connected with the electrodes referred to above. The furnace is filled with finely powdered charcoal, forming a bed in which the core of gas carbon and metallic ore rests. The charcoal possessing greater resistance to the electric current than the gas carbon, nearly all the current passes through the core; and the walls of the furnace, which would otherwise be destroyed by the intense heat, are protected from injury. When the poles of a powerful dynamo-machine are connected with the electrodes, and the current sent through the central core, owing to its great resistance, an intense heat is developed, far surpassing that of the most powerful blast-furnaces. The most refractory oxides are unable to withstand the temperatures attained in this furnace. Aluminium, boron, silicon, manganese, sodium, and potassium, are all quickly reduced to the metallic state, and the charcoal itself is changed to graphite in considerable quantities. Valuable results are expected from this process, not only in the cheapening of the cost of

certain metals and alloys, but also in an increased knowledge of the behavior of different elements at



THE DEATH PENALTY BY ELECTRICITY.

temperatures hitherto unattainable, and the consequent aid to investigations in theoretical chemistry.



WELDING A BAR BY ELECTRICITY.

WELDING METALS BY ELECTRICITY.—Another important application of electric heating is the electric welding process. The parts to be welded are clamped in vises and pressed against each other at the point where it is intended to unite them. A current of great heating power is then passed through the joint by suitable cables fastened to the vises, and the joint is brought to a melting heat and cooled off again before the heat has had time to spread any distance through either piece. The scaling or defacing of the work by the action of the coals when buried in a blacksmith's fire is thus avoided, and the risks of a bad joint from the presence of ashes or dirt are entirely disposed of. For the same reason very little flux is required. The nature of the joint produced is a little different from an ordinary weld. Instead of being hammered into a union at a red heat, the parts are actually melted together and frozen in an instant.

RANGE-FINDING AT SEA BY ELECTRICITY.—The latest advance in the art of finding distances at sea has been made in the United States, and re-

sults have been obtained which show that the problem of making accurate and quick range measurements by automatic means has finally been solved. People discovered long ago that marine wars could not be ended by paving the bottom of the ocean with cannon balls, and sea captains were instructed not to engage an enemy until he came within point-blank range, which is the distance over which the shot will fly before striking the water when the gun is fired at level from its port on board ship. This distance was then about 500 yards. The greater accuracy of modern weapons has increased this fighting distance, but still no naval conflict has been fought with a greater distance between the contending vessels than that of 1,100 yards. At any greater distance the firing was very inaccurate, not only because it is harder to hit a target at 1,500 yards than at 1,000 yards, but principally because it was difficult to ascertain the exact distance, and hence to determine the exact elevation required for the gun. To insure effectiveness, therefore, beyond point-blank range the exact dis-

tance must be ascertained, and as the target (an enemy's ship) is usually in rapid motion, this measurement must be made instantaneously and automatically, and without calculation. This is now accomplished by the invention of Lieutenant Bradley A. Fiske, of the U. S. Navy. The apparatus is by no means complicated, and involves nothing but simple elementary principles in mathematics and electricity. It is based on the familiar mathematical proposition that if two angles and one side of a triangle are known, the other two sides of the triangle can easily be found. The Fiske range-finder, however, eliminates all calculations, and finds the range automatically. A base-line fixed once for all on the ship is the known side of the imaginary triangle. The distance of the object is represented by either of the other two sides. The target, therefore, is at one angle of the imaginary triangle; and at the other angles, at the extremities of the fixed base-line, are placed two spy-glasses, which can be directed upon it. As these spy-glasses are turned into the proper position they move over and touch wires which are bent in the form of arcs. The difference in length of the wires passed over corresponds mathematically to the distance of the object. As this length of wire increases or diminishes, it will offer more or less resistance to an electrical current sent through it. A very simple electrical contrivance, amounting practically to a balance, allows this resistance to be measured and read, not in units of resistance, but in yards. The two spy-glasses being pointed at the target, the observer at each spy-glass has nothing to do but to keep it thus pointed. Elsewhere in the ship another observer may stand at a telephone listening to a buzzing sound produced by an electrical device known as a circuit breaker, and simultaneously moving with one hand a pointer over a graduated scale. The instant the buzzing in the telephone stops he reads the range denoted by the pointer from the scale, and conveys the information by a simple form of telegraph to the men at the guns.

While Lieutenant Fiske's invention finds its most immediate use for military purposes, it is not without peaceful adaptations. Many a ship has gone ashore, even in sight of land, through an error of judgment on the part of her navigator as to her distance from the coast. The range-finder will not only prevent such misjudgment, but even at night, when the friendly beacon seems to stand out like an isolated star in the midst of the black chaos of sky and water, the mariner may learn with certainty his distance from the perilous shoal or reef.

AN ELECTRIC PINNACE.—A wooden pinnace called the "Electric," built for the Royal Engineers, to be propelled by electricity, has recently been launched in England. She is 38 feet 6 inches long over all, by 8 feet 9 inches beam. Her mean draught is 2 feet 3 inches, with all machinery in position and 40 persons on board. The hull is built of mahogany and is unpainted. The motive power is electrical, there being 70 accumulators, having 19 plates each. They have a discharging current of 1 to 40 amperes and 120 ampere hours. The power is transmitted from the accumulators to a motor discharging 32 amperes at full power, the propeller rotating at 800 revolutions. The propeller is 22 inches in diameter, and is of delta metal. The maximum break-horse power is $5\frac{1}{4}$, which is said to give a mean speed through the water of $8\frac{1}{4}$ miles per hour. The motor is a single magnet machine, designed especially for marine propulsion. The boat will run from 8 to 12 hours with one charge of the accumulators. The total weight of all machinery is $2\frac{1}{2}$ tons, the displacement being $4\frac{1}{2}$ tons. There

are two masts, each carrying a balance lug-sail, there being also a stay-sail forward. The sail spread is about 350 square feet. With the effective lead ballast, given by the accumulators, the boat should perform well under canvass, especially in view of the small propeller that is characteristic of electrical vessels.

ELECTRIC ALARM THERMOMETER.—A recent invention is the application of an electric alarm to a thermometer, causing the thermometer to sound an alarm whenever the temperature rises above or falls below any required point. It is designed for use in offices, schools, hospitals, breweries, and all places where the maintenance of an equable temperature is desired. Its construction will be readily understood by reference to the accompanying illustration. The electrical alarm can be arranged to sound at any distance from the thermometer, and the device can thus be used to sound an alarm in case of fire.

ALTERNATING CURRENT FAN MOTOR.—Another interesting device

is a fan motor for use with alternating currents. The motor is simple in design and light in weight, and will drive a 12-inch fan at 1,000 revolutions per minute with a current of about one ampere. The whole apparatus, motor and pedestal, as illustrated, weighs only about 15 pounds, thus rendering it very portable.

The motor comprises an arc-shaped laminated field magnet and a continuously wound drum armature, having a finely laminated core and a commutator, the field magnet and armature windings being connected in series relation. The motor is used on a 50-volt transformer circuit, and exhibits almost no sparking. The simplicity of the device is one of its chief recommendations, presenting many analogous points of construction to a direct current motor, except its fine lamination, which adapts it for alternating currents. There is very little heating of the iron when the motor is in operation. It is adapted to a number of commercial and domestic uses, in which but little power is required, such as the operating of fans, and the driving of sewing-machines.

AN ELECTRIC AWAKENER.—One of the latest electrical novelties consists of an ordinary alarm clock with an electrical attachment, which includes in circuit one of the rollers at the bottom of the legs of the bed. When the hour arrives at which the sleeper has set the alarm, his weight closes the circuit and the bell rings, and continues to ring until the sleeper gets off the bed. A spring is adjustable to the weight of the person.

ELECTRICITY IN MACHINE BELTING.—In a dry atmosphere and between shafting practically insulated by wooden blocks, or other non-conducting means of support for the bearings, a troublesome development of electricity sometimes takes place with machine belts driven at a high velocity. The pulleys become veritable frictional electric machines, excited by the rubbing of the belting. Herr Bacher, inspector of lighting at the Dresden Theater, declares that very powerful effects may be produced by this means. A Leyden jar has been charged in a few seconds, giving sparks 4 millimeters long when discharged. It is probable that to



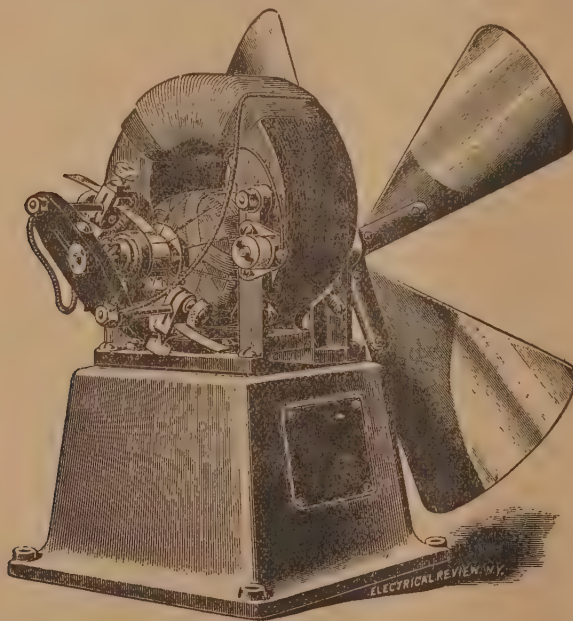
ELECTRIC ALARM THERMOMETER.

this cause may be attributed many disastrous fires, which are generally classified as spontaneous. Flourmills, factories in which the air is heavily charged with floating organic fibers of all kinds, are peculiarly subject to these mysterious conflagrations. All lines of shafting, therefore, should be metallically connected, through their bearings, with other masses of metal or the earth.

ELECTRO-THERAPEUTICS.—The medical and surgical relationships of electricity are so extensive that it is impracticable to give more than the briefest mention in a work of this character. In the "International Medical Annual" for 1890, A. D. Rockwell, M. D., of New York, an acknowledged authority on this subject, asserts that electricity is a tonic of a very high order. It possesses varied influences of this kind, according to the method of its application, and therefore may be indicated in

a multitude of symptoms, and for conditions apparently most diverse in their origin and character. Electricity may be said to be indicated whenever a constitutional tonic influence is called for. For the long period of convalescence following typhoid or typho-malarial fever, there is no remedy that is comparable with it; and in almost any condition where a constitutional tonic influence is indicated, electricity, in some one of its methods of applications, is likely to be of more or less service. It gives passive exercise to the muscles; it promotes and renders more natural the processes of excretion and secretion; it corrects circulatory disturbances—in a word, it imparts tone and strength to both nerve and muscle.

While the consensus of opinion among those who have had any adequate experience in the use of electricity is that it is occupying a position of



ALTERNATING CURRENT FAN MOTOR.

growing importance, there are yet differences of opinion in regard to its efficacy. Dr. M. Allen Starr, in a paper on the "Physics and Physical Action of Electricity," read at a meeting of the New York Academy of Medicine, March 21, 1889, stated: (1.) "Static electricity offered nothing more than the interrupted galvanic current, and failed to furnish those effects which were most desirable in the treatment of disease. (2.) The constant galvanic current could produce chemical changes which aided nutrition or destroyed tissue according to the strength employed. (3.) The constant galvanic current could transfer medicines into the body from without. (4.) The interrupted galvanic current or Faradic current could excite various organs to functional activity. (5.) It was questionable whether the pathological state causing organic diseases could be in any way influenced by electricity. (6.) If functional diseases were benefited, it was in an uncertain manner, and the physiological indications for the agent were as yet uncertain.

Dr. L. C. Gray, in a paper on the effects of "Electricity on Central Nervous Diseases," claimed it to be an efficient remedy in relieving sub-acute mania, melancholia, the insanity of doubt, and functional insanities, but only in the period of convalescence, not in the acute stage. Of the gross cerebral diseases it might be said that it was useless to administer electricity in brain tumors, meningitis of traumatic, epidemic, or aural origin, or in facial hemiatrophy. It was a useful adjuvant in intracranial syphilis, in the early stages of headache and insomnia, and sometimes in the later stages following hemiplegia.

Dr. W. R. Birdsall, in a paper on the "Effects of Electricity on Spinal-cord Diseases," while admitting that he had never seen a case of organic disease of the spinal cord cured by electricity, stated that he had never seen such a case cured by any single therapeutic agent whatever. But for the relief of symptoms he had seen electricity serve a more useful purpose than any other. Electricity was essentially a stimulant, an exciter of living

tissues. He believed, however, that the main benefit obtained from electricity in spinal-cord diseases was due to the peripheral impression.

Dr. E. D. Fisher, in a paper on the "Effects of Electricity in Functional Nerve Affections," considered galvanism more important as a remedial agent in functional nervous diseases than was static or Faradic electricity; yet, in neurasthenic cases, static electricity had a stimulating and pleasing effect. It was in functional diseases, however, with error in nutrition, and not organic troubles, that static electricity found its field of usefulness.

Dr. A. D. Rockwell, in a paper on "Electricity in Peripheral Nerve Lesions," declared that electricity sensibly hastened recovery in curable cases. While admitting that electricity possesses only a limited range of usefulness in severe lesions of either the central or peripheral nervous system, he thought it was one of the most efficient remedies we possess for the relief of the various symptoms associated with these lesions, while, for the removal of the finer nutritive disturbances that underlie many persistent neuralgias, the galvanic current was certainly a remedy of the greatest value.

CURATIVE EFFECTS OF ELECTRICITY.—An interesting illustration of the curative effects of electricity is reported from Bangor, Me. A lady who, as it was supposed, had become a crippled paralytic for life, and had been advised by her physicians that she could not live more than three months, while waiting for death to set her free from her sufferings, was taken out for a ride on an electric street car. Although very exhaustive, the ride appeared to do her good, and each pleasant day thereafter the trip was repeated, the invalid clearly improving day by day. In about a week her appetite showed a marked improvement, and her paralyzed limbs became more sensitive. In about two weeks a strange pricking sensation was felt in the hand and foot that were paralyzed, as if they were asleep. As both limbs had been without sensation for 12 years, this was deemed remarkable, and the rides were continued with increased frequency. In five weeks she exchanged her crutch for a cane, and in another week discarded the cane. All this time she had been taking no medicine, yet her strength steadily increased; and a few weeks later she was apparently entirely cured. One of Bangor's leading physicians, who had been in attendance upon the lady, stated that her recovery was entirely due to the currents of electricity passing through the car. She was naturally sensitive, and what to most persons would have been too weak a current to have been felt, acted as a tonic to her, and coming when it did led to her recovery.

ELECTRICITY AND HYGIENE.—Not only is electricity a useful slave to the industrial world, doing the mechanical work and annihilating time and space—it also is an ally and helper of sanitary science, and is rapidly becoming one of the most beneficent of sanitary agents known. The use of electric lights in churches, public halls, theaters, and other places of public assembly has been of immense advantage to the purity of the air, hitherto vitiated by the combustion of gas, oil, and kindred agents that depend on atmospheric oxygen for their illuminating power.

Within a very few years it has been discovered that a discharge of electric sparks through an atmosphere laden with dust, has the effect of causing the dust to settle; and this discovery has been utilized in lead furnaces to free the air of the deleterious fumes of volatilized lead. In flour mills, also, electricity is used to free the air from the im-

palpable dust which otherwise permeates the atmosphere, and which is injurious to the health of the workmen, as well as greatly increasing the risk of fire, owing to its extreme inflammability.

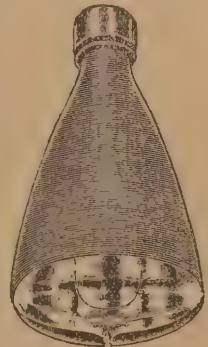
In the manufacture of alcohol from beet-sugar refuse as formerly carried on, the alcohol was liable to be contaminated with the higher alcohols which rendered it both unpalatable and dangerous to health. An electrical apparatus has been devised by means of which a certain number of molecules of hydrogen are added to these noxious alcohols, so that the distilled product is completely freed from their presence. Beverages prepared from the alcohol thus obtained are thus preserved from at least one deleterious admixture, and public health is so far the gainer.

Many lives in mines have been saved by the use of electricity, not only as an illuminant, but also as a substitute for the fuse formerly employed in blasting. Scores of miners met their death because the fuse burned too quickly, not giving them time to reach a place of safety before the explosion; or, if it burned too slowly, they often supposed it had become extinguished, and on approaching to place another fuse in its place, were surprised by the delayed discharge. Electricity induces the explosion at the precise moment desired, and if it fails the locality can be approached with perfect safety, as no discharge is possible until the electrical connection has been repaired.

In electrotyping, the battery process has been substituted in place of the old gilding and silvering by the aid of mercury, which was highly injurious to the health of the workmen.

Although it has been frequently asserted that the electric light affects the eyesight injuriously, no doubt much of the evil would be avoided if greater care were exercised in locating the lights. The fact that an incandescent lamp does not give out much heat and will not singe the hair or whiskers, is no reason why the lamp should be placed close to, or on a level with the eyes, where the light can shine directly in them. Incandescent lamps should be properly placed and shaded so as not to cast their rays directly on the eyes, and if these very simple precautions are carried out, there will be no complaint of the injurious effect of the electric light upon the eyesight.

ELECTRICAL INJURIES.—The rapid introduction of electricity as a method of lighting, heating, motor power and locomotion, to say nothing of its use in the telegraph and telephone, has developed a new class of diseases and injuries, which must be taken into account in a general treatment of the subject of electricity. The means by which the electrical current does harm varies, naturally, with the form in which it is used. The telegraph and telephone produce peculiar neuroses, due to the peculiar demand made upon the nervous system of the operator, and not to the electrical current directly, and results in telegraphers' cramp, aural and mental disorders, etc. Most of the observed cases of electrical injury come from the apparatus carrying electrical currents for lighting and power. Such in-

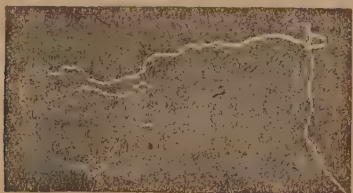


DESK LAMP.

juries were formerly produced only by lightning, and were consequently rare.

Electrical currents produce three kinds of severe accidents: (1) They kill at once; (2) they burn severely; or (3) they cause traumatic neuroses through mental and physical shock. Usually, if they burn severely they do not kill; hence, practically the rule is, if contact with electrical wires does not kill, the victim gets only a burn or a harmless shock. In very rare cases the current seems to affect the nerves or nerve-centers, causing paralysis. The minimum current safe to receive is not definitely known. Probably 800 to 1,000 volts of continuous current, and a third less of alternating current, would not be fatal. The wires for lighting and for power carry the more dangerous currents.

PHOTOGRAPH OF A LIGHTNING FLASH—The accompanying illustration is an exact copy of a photograph of a flash of lightning made by Joseph Gray, at Brixton, England, during a recent thunder storm. The flash presents a most striking and eccentric appearance, gradually dying away at the right-hand side, apparently in the distance, until it becomes too faint to affect the sensitized plate. The zigzag and irregular form of most lightning flashes is a very peculiar circumstance, and is usually explained by supposing that the air in the direct path of the electric current becomes compressed and condensed by its passage, thus increasing its resistance to the current, which is obliged to



change its direction, and pass through air of less density, according to the well-known law that an electric current always follows the path of least resistance. This is one of the most perfect and satisfactory photographs of a lightning flash yet obtained.

Commenting on the subjugation of this great and mysterious force to the uses of mankind, the following statistics eloquently attest the progress of the last decade in the three great branches wherein future improvements may be most reasonably expected: The present electric-railroad equipment in this country represents a value of about \$49,300,000 out of a total of \$164,400,000 for all street railways, of which \$53,900,000 may be apportioned to horse systems, \$49,000,000 to cable, and \$7,400,000 to steam.

In 1882 it was commonly regarded that telephone lines from 50 to 100 miles long, if managed according to the best lights of the time, hardly paid to do business over. In 1892, daily and continuous service was furnished between New York city and Buffalo, a distance of nearly 500 miles. The crowning triumph of long distance telephony was achieved, apparently, when, in 1893, a line was successfully established over a course of nearly 1,000 miles, and conversation was carried on between the citizens of New York and Chicago.

The development of the telegraph belongs properly to an earlier period than the last decade, but much has been done in the last few years in the way of extending the industry, in the introduction of new methods and in the improvement of old ones. The length of wire in use is over 900,000

miles. The capital invested approximates \$100,000,000.

ELECTRO-CHEMICAL ORDER OF THE ELEMENTS. The following table will show the electric order of the majority of the elements which are acted upon by gases and liquids and from which electricity can be generated. It is graduated from the electro-positive to the electro-negative:

<i>Electro-positive.</i>	Tin.	Tungsten.
Potassium.	Bismuth.	Molybdenum.
Sodium.	Copper.	Vanadium.
Lithium.	Silver.	Chromium.
Barium.	Mercury.	Arsenic.
Strontium.	Palladium.	Phosphorus.
Calcium.	Platinum.	Iodine.
Magnesium.	Gold.	Bromine.
Aluminium.	Hydrogen.	Chlorine.
Uranium.	Silicon.	Fluorine.
Manganese.	Titanium.	Nitrogen.
Nickel.	Tellurium.	Selenium.
Cobalt.	Antimony.	Sulphur.
Cadmium.	Carbon.	Oxygen.
Lead.	Boron.	<i>Electro-negative.</i>

ELECTROTYPING. See Britannica, Vol. XXIII, p. 703.

ELECTUARY, a form of medicinal preparation in which the remedy is enveloped or suspended in honey or syrup, so as to make a mixture of thick semi-fluid consistence.

ELEGIT, ESTATE BY, the right in lands which is enjoyed by one who has acquired the land under writ of elegit.

ELEGIT, WRIT OF, a writ whereby a creditor in England can seize the lands of his debtor in satisfaction of his claim. A creditor who has seized the lands is not entitled to take the person of his debtor.

ELEGY: in music, is a composition depicting feeling of mourning, sadness, longing, or ardent desire, and love.

ELEMENTAL SPIRITS beings who, according to the popular belief of the Middle Ages, presided over the four "elements," living in and ruling them. The elemental spirits of fire were called Salamanders; those of water, Undines; those of the air, Syphs; and those of the earth, Gnomes.

ELEMENTS, in astronomy, are those numerical quantities, and those principles deduced from astronomical observations and calculations, which are employed in the construction of tables exhibiting the planetary motions. They include the greatest, least, and mean distances of the planets from the sun, the eccentricities of their orbits; their mean motions, daily and annual, with the motions of their aphelia; and the inclinations of their orbits to the ecliptic; their masses and densities, etc.

ELEPHANT, a geographical term of obvious origin, indicating various localities in Asia and Africa. (1.) Elephant Point, a promontory of Pegu, in Further India. It marks the west extremity of the mouth of the Rangoon, the most easterly arm of the Irrawaddy. It is in latitude, 16° 28' N., and longitude 96° 25' E. (2.) Elephant Bay, an inlet of the Atlantic, on the coast of Benguela, Southwest Africa, in latitude 13° 14' S., and longitude 12° 33' E. (3.) Elephant Island, in Senegambia, about 100 miles up the Gambia. (4.) Elephant River, in the Cape Colony of South Africa. It enters the Atlantic after a course of 140 miles, about latitude 30½° S., and longitude 18° E.

ELEPHANTINE, a small island of the Nile, lying opposite Assouan, the ancient Syene, on the confines of Egypt and Nubia, in 24° 5' N. lat., and 32° 54' E. long. The island was anciently called Abu, or the "ivory island," from its having been the entrepot of the trade in that precious material.

ELEPHANT-SEAL (*Macrorhinus leoninus* or *proposcideus*), also known as the sea elephant, the largest of the seal family (*Phocidæ*), and an inhabitant of the seas of the Southern hemisphere (see

Britannica, Vol. XV, p. 444). It is sometimes 20 feet in length, with a circumference of about 18 feet at the thickest part, which is at the chest, immediately behind the fore-flippers or swimming-paws, the body tapering towards the tail. The color is grayish, bluish-gray, or more rarely blackish-brown. The whole body is covered with very short hair, distributed in patches, giving it a spotted appearance somewhat like watered silk. The swimming-paws are large and powerful, and have five nails, the thumb-nail easily distinguishable from the others; the hind-paws have not even the rudiments of nails, but are beautifully constructed, like the webbed foot of a bird, so as to expand, and increase the power of swimming. The true tail is very short, not more than six inches long. The head is larger in proportion than in many seals; the eyes are very large and prominent, with eyebrows of coarse hair; the whiskers are composed of very long and coarse spirally twisted hairs; there are no external ears; the canine teeth are remarkably large and massive, somewhat assuming the character of tusks. The nose of the males is prolonged into a kind of proboscis.

ELEVATED ROADS. Owing to the increasing difficulties attendant upon intramural transportation, the elevated railroad has, during the last few years, come largely into favor in populous cities. The problem of how best to transport vast numbers of passengers within a very limited space of time was one to which a solution was most desirable. In London it was disposed of by the construction of an underground railway, the chalk formation and consequent excellent drainage rendering the driving of an extended system of tunnels entirely feasible. In Paris the difficulty was met by the building of a circular railroad, operated by steam power and embracing a sufficiently comprehensive territory to materially relieve the congested district. About 15 years ago, an elevated road was erected in Berlin which was operated by cable. This system, was, however, found to be cumbersome and impracticable. As a tentative experiment, however, it had its uses, for capitalists who had hitherto been reluctant to invest in this class of property, seemed to see in the Berlin road possibilities for lucrative returns, and the system has since been expanded by the substitution of a splendidly equipped elevated road operated by electricity. While the intramural termini of the railroads running into London are practically reached by tracks elevated above the streets, these tracks are merely extensions of main lines and cannot correctly be styled city elevated railroads. The beds of these roads are built, for the most part, on long lines of brick arches, of the most substantial character, the space between the spans being devoted to warehouse purposes. Apart from a single line of elevated road which is used in Liverpool to carry freight from the docks, we must look to the United States as the home of the modern elevated railroad; and of the great cities of the Union which have adopted it, New York is undoubtedly at the head. In 1875 an experimental line was projected from Fourteenth street to Cortlandt street on Greenwich street. It was finished in the summer of that year, and a train of cars loaded with brick and stone was run over the structure. Nearly the entire length of the line had been traversed when the rails spread, allowing the cars and engine to fall to the street below. The stockholders of the company were so greatly discouraged by this mishap that it was not until the following year the road was opened for business. This road was regarded as insubstantial and unsafe by the general public, and was not largely availed

of until it was remodeled and strengthened. Dr. Gilbert, the inventor of a greatly improved system, was the next to attempt to revolutionize urban travel and a few years later the Gilbert Elevated Railway Company was formed, which erected a permanent way from the Battery along Church street and Sixth avenue to Central Park. After much litigation the original proprietors sold out to the Metropolitan Railroad Company, a wealthy corporation, which extended the road to Harlem. The Third avenue and the Second avenue roads were built later. Chicago has also adopted this system and there have been constructed within the city limits two roads, the Lake Street Elevated, not yet running, and the South Side Alley Road, which has been for some months in operation. Another alley road has been projected for the west side, which will run nearly on the line of Van Buren street, and extend some miles westward. The general character of all these structures is the same, and consists of a system of angle irons strongly bolted and running either transversely, horizontally or longitudinally. It is predicted that elevated roads will ultimately entirely supersede other methods of rapid transit in vogue in great cities.

ELEVENTH, in music, is the interval of the octave above the fourth.

ELGIN, a city of Illinois, located in Kane county, on the Fox River, 36 miles northwest of Chicago. It is the center of a large dairy business, and has important manufactures, especially of watches, carriages, washing-machines, shoes, farming implements, etc. The Elgin National Watch Works employ 3,000 skilled hands, and manufacture 1,800 watches daily. In addition to twelve public schools there is an academy, a Catholic seminary, a school of manual training, and a public library. The Northern Illinois Hospital for the Insane is located at Elgin. The growth of the city has been very rapid during the last decade. Population in 1880, 8,787; in 1890, 17,429.

ELIAS, MOUNT ST., a mountain on the north west coast of America, in latitude $60^{\circ} 18'$ and in longitude $140^{\circ} 30' W$. It rises about 17,860 feet, or almost $3\frac{1}{2}$ miles above the sea, being visible to mariners at a distance of 50 leagues.

ELIE, or **ELY**, a pretty little watering-place of Scotland, County of Fife, 23 miles northeast of Edinburgh (34 by rail). Population, 917.

ELIOT, CHARLES WILLIAM, an American educator, born in 1834. In 1854 he was appointed tutor in mathematics at Harvard; in 1858 became assistant professor in mathematics and chemistry; in 1861 taught chemistry in Lawrence Scientific School; from 1863 to 1865 studied chemistry in Europe; in 1865 became professor of analytical chemistry in the Massachusetts Institute of Technology, and in 1869 was elected president of Harvard University. He is a member of many scientific and literary bodies, and is a popular public speaker. He has written various works on chemistry.

ELIOT, GEORGE. See CROSS, MARIAN, in these Revisions and Additions.

ELIOT, JOHN (1754-1813), an American clergyman. He began to preach in 1776; was for a time chaplain of a Boston regiment, and from 1779 till his death was pastor of the New North Church of Boston. He published a *Biographical Dictionary of Eminent Characters in New England*.

ELIOT, SAMUEL, an American author, born in 1821. From 1839 to 1841 he was in a Boston counting-house; spent four years in foreign travel; on his return taught private school; was professor of political science and history in Trinity College, Hartford, Conn., in 1856-64; its president, 1860-64; lecturer on constitutional law and political science,

1864-74; lectured at Harvard in 1870-73; was master of the Boston Girls' High School in 1872-76; superintendent of the Boston public schools in 1878-80; was an overseer of Harvard in 1866-72; and in 1868-72 was president of the American Social Science Association. He has published many works on historical and other subjects.

ELIXIR, a term in pharmacy which has come down from the days of alchemy, and is applied to various preparations, consisting mostly of solutions of aromatic and bitter vegetable substances in spirits of wine. The term tincture is now more common.

ELIZABETH, MADAME (1764-94), a French princess, sister of Louis XVI.

ELIZABETH, a city of New Jersey, and county-seat of Union county (see *Britannica*, Vol. VIII, pp. 145-46). Although largely a place of residence for New York business men, Elizabeth has numerous manufactures, some of them of national importance. A sewing machine company in this city has a factory which occupies 22 acres and employs 3,000 men, in the manufacture of machines. The manufacture of cordage is another industry which has grown to large proportions. The city is supplied with excellent water, obtained from the Elizabeth River at its source at the base of the mountains 20 miles distant. The high school building, presented to the city by one of its citizens, Mr. Joseph Battin, is one of the finest school buildings in the State. The city has a general hospital and dispensary, a home for aged women, and an orphan asylum. Library Hall has recently been completed at a cost of \$50,000, and contains a large library. The public school system is divided into five branches of instruction: normal training for teachers, manual training, high school, grammar schools, and primary schools. In addition to these there are numerous private boarding and day schools, including a business college, with a preparatory college course. Population in 1880, 23,229; in 1890, 37,683.

ELIZABETHAN ARCHITECTURE, a term applied to the mixed style which sprang up on the decline of Gothic architecture. By some it is called the Tudor style, but that name belongs more correctly to the Perpendicular, or latest kind of Gothic.

ELIZABETH CITY, the county-seat of Pasquotank county, N. C., on Pasquotank River. It has a deep, safe harbor, which can be entered by large vessels; has a park, State normal school, planing-mill, shingle factories, and cotton factories. It is 46 miles south of Norfolk, Va., with which it is connected by rail. Population (1890), 3,251.

ELIZABETH ISLANDS, the name given to 16 small islands off the coast of Massachusetts between Buzzard's bay and Vineyard sound.

ELIZABETHTOWN, the county-seat of Essex county, N. Y., on Bouquet River, 125 miles north of Albany, situated in the vicinity of iron mines.

ELIZABETHTOWN, a village and county-seat of Hardin county, Ill., on the Ohio River, situated in a lead-bearing region.

ELIZABETHTOWN, a railroad junction and county-seat of Hardin county, Ky., 42 miles southwest of Louisville.

ELIZABETHTOWN, a village of Lancaster county, Pa., 18 miles northwest of Lancaster city. It manufactures farming implements.

EL-KHARGEH, capital of the Great Oasis, Upper Egypt, situated in latitude 25° 28' N., longitude 30° 40' E. In the vicinity of the town are numerous ruins, among which are those of a temple; there is also a remarkable necropolis. Population, 6,000.

ELKHART, a city of Indiana, situated at the confluence of the St. Joseph and Elkhart Rivers, in Elkhart county, in the northern part of the State. The town was settled in 1832, and incorporated as a city in 1875. The streets are well paved and lighted with gas and electricity. The principal manufactures are musical instruments, flour, starch, paper, carriages; it has iron foundries and planing mills. The locomotive shops of the Lake Shore railroad are located here. Population in 1880, 6,953; in 1890, 11,370.

ELKHORN, a railroad junction and county-seat of Walworth county, Wis. It is situated in a rich farming district. Pop., 1,447.

ELKHORN RIVER rises in the north-eastern part of Nebraska, flows southeast, and enters the Platte River. It is about 250 miles long.

ELK POINT, a railroad junction and county-seat of Union county, South Dakota, on the Missouri river, 21 miles northwest of Sioux City.

ELK RIVER, the county-seat of Sherburne county, Minn., situated 38 miles northwest of St. Paul, and on the Elk and Mississippi Rivers. It has many manufactures, and its principal business is lumber, stock and grain. Pop., 769.

ELK RIVER rises in Rich Mountains in West Virginia, flows westward for 150 miles and enters the Great Kanawha River at Charleston.

ELKTON, the county-seat of Cecil county, Md., at the head of navigation on Elk River, 52 miles northeast of Baltimore. Flour, iron and paper are here manufactured. The place was settled by Swedes in 1694.

ELL, a measure of length now little used. It was originally taken in some vague way from the arm, and hence has been used to denote very different lengths. The English ell, as a measure of cloth, is equal to five-quarters of a yard.

ELLAND, a town of England, in the West Riding of Yorkshire, on the river Calder, three miles southeast of Halifax by rail. It has cloth-mills, and there are valuable stone-quarries in the vicinity. Population, 3,278.

ELLENRIEDER, MARIE, a female painter of very high excellence, born at Constance in 1791, studied in Munich, and in 1820 went to Rome to perfect her knowledge of art. On her return to Germany she painted a *Martyrdom of St. Stephen* as an altar-piece for the Roman Catholic Church at Karlsruhe. She was afterwards appointed court-painter at Munich, but subsequently fixed her residence at Constance, and devoted herself exclusively to her profession. Among her principal pieces are the *Transfiguration of St. Bartholemey*, *Christ Blessing Little Children*, *Mary and the Infant Jesus*, *Joseph and the Infant Jesus*, *St. Cecilia*, *Faith*, *Hope and Charity*, and a *Madonna*.

ELLENVILLE, a thriving village of Ulster county, N. Y., 30 miles west of the Hudson River, situated at the foot of Shawangunk Mountains. It has fine public and private buildings, is a favorite summer resort, and the seat of Ulster Seminary. Glass, cutlery, leather, stoneware pottery, and boats are here manufactured. Population, 2,881.

ELLERY, WILLIAM (1727-1820), a Signer of the Declaration of Independence. He began the practice of law in 1770; became a member of the Continental Congress in 1776, continuing in office till 1786, with the exception of the years 1780 and 1782; was commissioner of the Continental loan office for Rhode Island in 1786; for a time was chief justice of the Rhode Island superior court; and from 1790 till his death was collector of Newport.

ELLETT, CHARLES (1810-62), an American civil engineer. After spending some time in engineering pursuits in the United States he completed his

education in Europe. He was connected for a time with various railroads in America, and was chief engineer of the James and Kanawha canal. In 1842 he built the wire suspension bridge across the Schuylkill River at Philadelphia, the first of its kind on the continent. In 1847 he planned and built the suspension bridge over the Niagara River, and later built a suspension bridge at Wheeling, Va. He afterwards engaged in numerous important engineering works, and in 1861 was commissioned colonel of engineers in the army. While on duty on the Mississippi River, off Memphis, he received a musket-ball wound above the knee, from the effects of which he died.

ELLCOTT, CHARLES JOHN, bishop of Gloucester and Bristol, born at Whitwell, near Stamford, April 25, 1819. He graduated from Cambridge University in 1841, and was elected fellow of St. John's College. In 1848 he became rector of Pilton, Rutlandshire, and professor of divinity at King's College, London, in 1858; Hulsean lecturer at Cambridge in 1859, and Hulsean professor of divinity the year after. He was nominated dean of Exeter in 1861, and raised to the episcopal bench in 1863. Dr. Ellicott was chairman for eleven years of the New Testament Revision Committee, and he is well known as a commentator on the Epistles of the New Testament.

ELLCOTT CITY, the county-seat of Howard county, Md., on the Patapsco River, 10 miles southwest of Baltimore. It has two cotton factories, a large flouring mill, a barrel factory, machine shop, a foundry, and three colleges. Population, 1,485.

ELLCOTTVILLE, a village of Cattaraugus county, N. Y., on Great Valley Creek, 44 miles southeast of Buffalo, on the Rochester and State line railroad. Population, 852.

ELLIOT, JEAN (1727-1805), the author of *The Flowers of the Forest*, a touching lyric on the disaster of Flodden. The greater part of her life was spent in Edinburgh.

ELLIOTT, ROBERT WOODWARD BARNWELL (1840-87), an American P. E. bishop. He entered the Confederate army at the beginning of the civil war, and attained the rank of major. In 1868 he took deacon's orders; was ordained priest in 1871, and the same year became pastor of St. Philip's church in Savannah, Ga. In 1874 he was consecrated missionary bishop of western Texas.

ELLIOTT, STEPHEN (1771-1830), an American naturalist. In 1793 he became a member of the legislature of South Carolina, and continued in office until 1812, when he became president of the bank of the State. He was one of the founders of the Literary and Philosophical Society of South Carolina; in 1825 was instrumental in the establishment of the State Medical College, and was its professor of natural history and botany. He published a work on *The Botany of South Carolina and Georgia*.

ELLIOTT, STEPHEN, JR. (1806-66), an American P. E. bishop, son of the naturalist. He practiced law from 1827 to 1833; was ordained deacon in 1835; was professor of sacred literature in South Carolina College; took priest's orders in 1836; became first bishop of the diocese of Georgia in 1840; in 1841 was made rector of St. John's church, Savannah, and in 1844 became provisional bishop of Florida. Subsequently he was rector of Christ's church, Savannah, until his death.

ELLIOTT, WILLIAM, a lawyer, born in Beaufort, S. C., Sept. 3, 1838. He was educated at Beaufort College, Harvard University, and the University of Virginia; entered the profession of law in Charleston, S. C., in 1861, and served as an officer in the Confederate army during the war of the

Rebellion. In politics he is a Democrat, and was elected a member of the State legislature and intendant of Beaufort in 1866; was a delegate to the Democratic National Convention in 1876 and 1888, and a Democratic Presidential elector for the State at large in 1880. He was elected a Representative from the Seventh Congressional District of South Carolina to the 50th Congress; was declared elected to the 51st Congress, but was unseated by the House of Representatives. He was elected from the same district to the 52d Congress in 1890.

ELLIPSIS, a term used in grammar and rhetoric to signify the omission of a word necessary to complete the expression or sentence in its usual form. The object of ellipsis is shortness and impressiveness.

ELLIS, ALEXANDER JOHN (formerly Sharpe, the name having been changed in 1825), F. R. S., English philologist, born at Hoxton, near London, June 14, 1814; studied at Shrewsbury and Eton, graduated with high honors at Trinity College, Cambridge, in 1837, and studied law in the Middle Temple. He has published *The Alphabet of Nature* (1845); *Essentials of Phonetics* (1848); *Early English Pronunciation* (1869); *Speech in Song* (1878); *Basis of Music*; and has translated Ohm's *Spirit of Mathematical Analysis* and Helmholtz's *Sensations of Tone as a Physiological Basis for the Theory of Music*.

ELLIS, GEORGE EDWARD, an American clergyman, born in 1814. He was ordained in 1840 as pastor of the Harvard Unitarian church, Charlestown, Mass., remaining there until 1869; was professor of systematic theology in Harvard Divinity School in 1857-63; was at one time editor of the "Christian Register," and later of the "Christian Examiner." In 1887 he became president of the Massachusetts Historical Society. He is the author of many works, principally of a biographical or historical nature.

ELLIS, ROBINSON, an English classical scholar, born at Barming, Kent, Sept. 5, 1834, and educated at Walthamstow, at Rugby, and at Oxford. He was elected a fellow of Trinity College, Oxford, and there remained till 1870, when he became professor of Latin in University College, London. Six years later he returned to Oxford. He has contributed a number of philological articles to English and American periodicals, and has published critical editions of the *Ibis* of Ovid and of the text of Catullus.

ELLORE, a town in the Godavari district, Madras, India, on the Jammaler River, 225 miles north of Madras, with manufactories of woolen carpets and saltpeter. The heat is very oppressive, reaching 110° F. in the shade. Population, 25,092.

ELLSLER, FANNY, born in Vienna, Austria, June 23, 1810; died Nov. 27, 1884. She became famous as a dancer in nearly every European country and in the United States. Her sister Therese (1808-1878) was almost as well known as a dancer.

ELLSWORTH, EPHRAIM E., born in New York State, April 23, 1837; killed in Alexandria, Va., May 24, 1861. He organized a regiment of zouaves, of which he was Colonel. At Alexandria he tore down a Confederate flag from an hotel and was shot dead by the proprietor, Jackson, who was immediately killed by a soldier.

ELLSWORTH, a town of Kansas, and county-seat of Ellsworth county. It has good water-works, parks, schools, churches, and mills. Rock salt has recently been here discovered 730 feet below the surface of the ground. Population (1890), 1,620.

ELLSWORTH, the county-seat of Pierce county, Wis., 40 miles southeast of St. Paul, Minn. It has a stove-mill and steam saw-mill.

ELLSWORTH, OLIVER (1745-1807), an American jurist. He was admitted to the Connecticut bar in 1771; at the outbreak of the Revolution was chosen to represent Windsor in the general assembly; in 1778 took his seat as a delegate to the Continental Congress, and from 1780 to 1784 was a member of the governor's council. In 1783 he was reelected to Congress, but declined to serve. He became judge of the Connecticut superior court in 1784, and in May, 1787, was made a member of the Federal convention at Philadelphia. In 1789 he was made a United States Senator; from 1796 to 1800 was chief justice of the United States Supreme Court; 1800-01 was at the head of a commission to negotiate with France; and in 1802 was again elected a member of the governor's council. In 1807 he again became chief justice of the Connecticut Supreme Court.

ELLWANGEN, a town of Württemberg on the Jagst River, 55 miles north of Ulm by rail. The old castle of Hohen-Ellwangen has been used as an agricultural school since 1843. Population, 4,793.

ELM, a village of Switzerland, at the head of a valley in the canton of Glarus. In 1881 the whole of the northern side of Tshingel Peak (10,230 feet) crashed down upon it, destroying a large part, and filling the valley with débris.

ELMALU, a town of Asia Minor, in the province of Konieh, on the Lycian tableland, 45 miles west of Adalia. It has manufactories of red leather and dye-works. Population, 25,000, chiefly Greeks and Armenians.

ELMENDORF, JOHN JAMES, an American educator, born in 1827. In 1848 he became instructor of mathematics at Columbia College, and in 1868 professor of philosophy in Racine College, Wis. Among his works are: *Manual of Rites and Ritual*; *History of Philosophy*; and *Outlines of Logic*.

ELMIRA, a city of New York, and county-seat of Chemung county (see *Britannica*, Vol. VIII, p. 153). Six railroads center here: viz., New York, Lake Erie and Western; the Delaware, Lackawanna and Western; Northern Central; Lehigh Valley; Elmira, Cortland and Northern; and the Tioga. The city contains 90 miles of streets, most of which are paved, lined with handsome shade trees, and well lighted with gas and electricity. The area of the city is 3,000 acres. A board of trade was organized in 1879. Manufacturing interests are numerous and extensive, giving employment to about 4,000 persons. The educational advantages of Elmira are excellent. The city has over \$3,000,000 invested in school property. There are 9 public schools, 4 private select schools, 3 commercial colleges, and the Elmira Female College (Presbyterian), with an endowment of \$100,000. Among the charitable institutions are the Arnot-Ogden Memorial Hospital, Home for the Aged, Orphan's Home, Industrial School, and the Anchorage. The city contains six parks, among them Eldridge Park, with an area of 89 acres; Riverside Park, 40 acres; and Grove Park, 10 acres. Population in 1880, 20,541; in 1890, 28,070.

ELMORE, a village of Ottawa county, Ohio, on Portage River, 16 miles from Toledo and 20 miles from Lake Erie.

ELMO'S FIRE, Sr., the name of an electric display sometimes seen, during thunder storms, of a brush or star of light at the tops of masts, spires, or other pointed objects. See *Britannica*, Vol. XIV, p. 633.

ELMSHORN, a town of Denmark, in the duchy of Holstein, 20 miles northwest of Hamburg, situated on both banks of the Kruckau, a navigable stream, and feeder of the Elbe. It is well built.

has considerable manufactures, and an active trade in grain; it has a boat-building yard and tanneries.

ELMSLEY, PETER, classical scholar, born in 1773, educated at Oxford, where he graduated B. A. in 1794, and in 1823 was appointed principal of St. Albans Hall, and Camden professor of ancient history. He contributed to the *Edinburgh* and *Quarterly* reviews, but is now remembered only by his valuable critical work on Sophocles and Euripides.

ELMWOOD, a village of Peoria county, Ill., 163 miles southwest of Chicago.

ELOCUTION (*Lat.*, for speaking out), the art of effective speaking, more especially of public speaking. It regards solely the utterance or delivery; while the wider art of oratory, of which elocution is a branch, takes account also of the matter spoken.

ELOGE. When a member of the French Academy dies, it is customary for his successor to deliver an oration setting forth his merits and services. This is called an *éloge*, and a considerable branch of French literature goes by the name.

ELOHIM (Hebr., plural of *Eloah*; Arab., *Ilāh*; Chald., *Eldāh*; Syr., *Alāh*), might, power; in plur., intensified, collective, highest power—great beings, kings, angels, gods, *Deity*. As a *pluralis excellentiæ* or *majestatis*, and joined to the singular verb, it denotes, with very rare exceptions, the One true God. Joined to a plural verb, however, it usually means gods in general, whether including the One or not.

EL PASO, a city of Woodford county, Ill., containing mills, grain elevators, agricultural implement works, and a carriage manufactory.

EL PASO, a city of Texas, and county-seat of El Paso county, situated on the left bank of the Rio Grande River, at one of the great gateways of travel between the United States and Mexico. In 1881 the first railroad reached the city; ten years later five great trunk lines centered here, having their main connections with the Pacific coast, the Mexican capital, and the great grazing and mining regions of the Rocky Mountains. The public schools are excellent. El Paso contains a court house costing \$100,000, a jail costing \$35,000, a handsome city hall, custom house, and a federal building costing \$200,000. There is no city debt. The United States Government has established a military post in the vicinity, the citizens having donated 1,000 acres of land for that purpose. Population in 1880, 730; in 1890, 10,836.

ELPHIN, a bishop's see in Roscommon, Ireland, united to Kilmore in 1833.

ELPHINSTON, JAMES, 1721-1809. A poet and man of letters, was born at Edinburgh, and began life as a teacher near London. He became the close friend of Dr. Johnson, whose *Rambler* he edited in eight volumes. In the face of much public ridicule, Elphinston for years persisted in an attempt to change the orthography of the English language to a phonetic basis.

ELSTER, the name of two rivers of Germany, the White and the Black Elster. The White Elster rises at the foot of the Elster Mountains, on the northwestern boundary of Bohemia, flows in a northerly direction, and falls into the Saale three miles south of the town of Halle, in Prussia. Its chief affluent is the Pleisse from the right. Total length, 110 miles. The Black Elster rises in the kingdom of Saxony, within two miles of Elstra, flows northwest, enters Prussia, and joins the Elbe eight miles southeast of Wittenberg. Length, 105 miles.

ELSTER, KRISTIAN, a Norwegian novelist, born, March 4, 1841, died April 11, 1881. He was author

of *Tora Trondal and Farlige Folk*, both works of great merit. The latter had not yet appeared in print at the time of the author's death. Some short sketches of his were collected and published by Alexander Kjølland in a volume entitled *Solskyer* (1882).

ELSTRACKE, RENOLD, a noted English engraver, born probably in Belgium in the 16th century. His engravings, including portraits of the kings of England, of Mary Queen of Scots, and other notabilities, are much sought after, chiefly from their rarity.

ELSWICK, a township on the outskirts of Newcastle, England. The works of Sir W. G. Armstrong, Mitchell & Co., are located here. The engineering section of these works dates from 1847, the ordnance works from 1857. The frontage on the river is about one mile, the entire area about 125 acres, and 14,000 people are employed. Population, 34,642.

ELTON, a shallow, oval-shaped salt lake of Russia, with an area of 62 square miles, in the government of Astrakhan, the center of it being in lat. 48° 56' N., and long. 46° 40' E. In spring the lake has a layer of almost pure salt crystals, from 2 to 4½ inches thick. The annual yield is about 96,000 tons, or about one-seventh of the total production of Russia.

ELTON, CHARLES ISAAC, an eminent jurist and ethnologist, of Whitley, Somerset, England, born in 1839. He was educated at Cheltenham and Balliol College, Oxford, became fellow of Queen's College in 1862. Was called to the bar at

Lincoln's Inn in 1865, and afterwards became Q. C. He was returned to Parliament as a Conservative in 1884, was defeated in 1885, but again returned the year after. His books had already gained him reputation as a jurist, when he placed himself in the front rank of English ethnologists by his *Origins of English History* (1882).

ELUTRIATION is the term applied to the process of separating, by means of water, the finer particles of earths and pigments from the heavier portions. This process is much employed in the manufacture of the materials used in pottery and in the preparation of pigments.

ELWES, JOHN, M. P. (1714-89), a famous English miser. He would walk miles in the rain to save the hire of a conveyance, or risk his life to save paying a penny at a turnpike. He died at Marcham, Berkshire, leaving property worth two and a half millions of dollars.

ELYRIA, the county-seat of Lorain county, Ohio, finely situated at the junction of the east and west branches of the Black River, 7 miles south of Lake Erie. It contains a telegraph college, gas factory, has excellent water power, and manufactures cheese, building-stone, grindstones, tobacco, screws, and confectionery. Pop., 5,611.

ELZE, FREDERICK KARL, Shakespearian scholar, born at Dessau, May 22, 1821, died at Halle, Jan. 21, 1889. He studied at Leipzig and Berlin, devoting especial attention to English literature. In 1875 he was appointed to the newly established chair of English language and literature at Halle.

EMANCIPATION, CHRONOLOGICAL OUTLINE OF. For general article on the subject of Slavery, the Slave-trade, and Emancipation, see *Britannica*, Vol. XXII, pp. 129-144. The following chronological historic outline furnishes a convenient summary of facts, classified by countries, relating to the prevalence of slavery at different periods, and indicating the progress and success of the vigorous efforts put forth in behalf of universal emancipation:

The custom of selling men and women into bondage was introduced into Egypt, Arabia, and other countries of the East, from Chaldea.

The Jews were permitted to make bondsmen of the captives taken in war, and also to make slaves of insolvent debtors—the service to continue until the debt was paid, with the provision that all slaves should be given their pardon in the fiftieth, or "Jubilee" year, and that those whose slavery was the result of debt should all be free at the close of a period of 7 years.

In Greece, in the days of Homer, all prisoners were regarded as slaves (1000 B. C.). In Attica alone there were 400,000 slaves (317 B. C.). When Alexander razed Thebes he sold the whole people for slaves (335 B. C.).

In Rome many thousand prisoners were held as slaves, and in many cases were chained at the galley oars in perpetual servitude. It was a common habit to find slaves chained to the gate of a rich man's house to admit the invited guests (265 B. C.—250 A. D.).

C. Polto, the Roman, was accustomed to throw any offending slaves into his ponds to fatten his lampreys (42 B. C.).

The first Janissaries (an order of Turkish infantry) were selected from among the Christian slaves seized in battle (1330).

In England, under Saxon and Norman rule, the peasantry were commonly sold for slaves. Children were sold in the Bristol market the same as cattle, for home use or for exportation to Ireland, Scotland, and other countries, and slaves were entailed by bequest the same as other property.

The English slave-trade was begun by Sir John Hawkins and other Englishmen. First expedition took place in 1562. England employed 130 ships in the slave-trade, and carried 42,000 slaves in 1786.

In the time of the Stuarts several English slave-trading companies were chartered by the English government, and Charles II and James II were members of some of them, while James II was at the head of one (1660-80).

The privilege of supplying slaves to the American Colonies was conferred by special grant to certain English companies, with which many persons of royal blood were connected (1681-1750).

So great were the evils of slavery in England that several laws relating to it were enacted in 1371-1814.

THE MODERN SLAVE-TRADE.

The slave-trade as a department of commerce began in this wise: In 1441 two officers of an exploring party, under the leadership of Prince John (third son of King John I), of Portugal, seized some Moors and conveyed them to Portugal. A year later these Moors were allowed to ransom themselves, and among the goods given by them were 10 black slaves. The value of such persons in commerce was thus suggested, and three years later a large company was organized to engage in the business. The claim of the managers was that the traders did not enslave the Africans, but merely transferred them from one condition of servitude to another, which they regarded as less wretched. The first 4 slaves captured by the Portuguese were in 1444.

A large number of slave stations were opened in Africa, about 1445-1495.

Generally prevalent in a belt of African country, extending about 900 miles on each side of the Equator, for 310 years (1485-1795).

Accredited authorities estimated that the slave-trade carried on by Europeans had involved a total of 90,000,000 of Africans up to 1784.

The slaves taken from Africa in a single year numbered 104,000—namely, in 1768.

* A statute was enacted, by Edward VI, that a runaway, or any one who lived idly for three days, should be brought before two justices of the peace, and marked V with a hot iron on the breast, and adjudged the slave of him who bought him for two years. He was to take the slave and give him bread, water, or small drink, and refuse meat, and cause him to work by beating, chaining, or otherwise; and if, within that space, he absented himself fourteen days, he was to be marked on the forehead or cheek by a hot iron with an S, and he was his master's slave forever; second desertion was made felony. It was lawful to put a ring of iron round his neck, arm, or leg. A child might be put apprentice, and, on running away, become a slave to his master (1547).

Queen Elizabeth ordered her bondsmen in the western countries to be made free at easy rates (1574).

Serfdom was finally extinguished in 1660, when tenures *in capite*, knight's service, etc., were abolished.

When the Spaniards conquered Mexico they found in operation a well-defined "Aztec code" relating to slavery. This code recognized several classes of slaves: prisoners of war, which were generally reserved for sacrifice; criminals, public debtors, and those who, in poverty or extreme peril, had voluntarily resigned their freedom; and children who were sold by their parents. Slavery in Mexico, however, was so regulated by the Aztec laws as to be much less severe than in most countries, except in case of prisoners taken in battle, or of those slaves who were refractory or vicious—these being held for sacrifice. Such was slavery in Mexico in 1521-91.

Documents presented to the British government showed that since 1793, 3,500,000 native Africans had been taken from their homes, and had either perished on shipboard, or had been sold in the West Indies, during the period ending with 1807.

The slaves in the United States in 1800 numbered 697,897; in 1810, 1,191,364; in 1820, 2,009,831; in 1850, 3,204,313; 1860, 4,002,996.

SUPPRESSION OF THE SLAVE-TRADE BY GREAT BRITAIN.

"The Society for the Suppression of the Slave-trade," founded in England by Clarkson, Wilberforce, and Dillwyn, 1787.

Slave-trade question debated in British Parliament (1787). The debate for its abolition continued two days, April, 1791. Mr. Wilberforce's motion lost by a majority of 88 to 83, April 8, 1793.

The trade abolished by British Parliament, March 25, 1807. It is said that about 40,000 slaves were landed at Cuba in 1800.

A treaty between Great Britain and the United States, for the abolition of the slave-trade, was signed April 7; ratified May 20, 1862.

The Spanish government denounced the slave-trade as piracy, November, 1865.

Sir Samuel Baker headed an English expedition to put down slave-trading on the Nile, January, 1870; reported to be partially successful, June 30, 1873. He published *Ismailia*, a history of the expedition, 1874.

The species of slave-trade arose about 1870 in the South Seas; the natives being enticed on board certain British vessels and shipped to Queensland, Australia, and the Fiji Isles; the subject was brought before the British Parliament, 1871-72.

The ship *Carl* (owner, Dr. James P. Murray; master, Joseph Armstrong) left Melbourne for South Sea Isles; it anchored off Malakolo, Solomon's, and Bougainville Isles, and kidnapped many natives as laborers for the Fiji Isles; and within about twenty miles from land the prisoners arose and attempted to set fire to the ship; were fired on; about 50 killed and 20 wounded were cast into the sea. At Melbourne Murray gave evidence, and Armstrong was committed for trial, Aug. 16; master and mate sentenced to death, November, 1872.

Sir Bartle Frere went to Zanzibar on a mission to suppress the East African slave-trade (1872-73).

An act of Parliament, for consolidating with amendment the acts for carrying into effect treaties for the more effectual suppression of the slave-trade, passed Aug. 5, 1873.

Several African kings and chiefs, at Cape Coast Castle, agreed to give up slave-trade, at an interview with Governor Strahan, Nov. 3, 1874.

Slave-trade on the Gold Coast abolished by proclamation of Governor Strahan, Dec. 17, 1874.

Convention with Egypt forbidding the slave-traffic, Aug. 4, 1877.

Col. Gordon's efforts to suppress it in the Soudan reported successful (1879).

Slave-traffic prohibited at West African Conference, Jan. 7, 1885.

Slave-trade in East Africa checked by British cruisers in 1886.

England and Germany proclaim the blockade of East coast of Africa, from Suakin to Zanzibar, for the suppression of the slave-trade, Dec. 2, 1888.

Slave-trade reported nearly extinct in Egypt (only a few slaves remaining), May, 1889.

ABOLITION OF SLAVERY BY GREAT BRITAIN.

Act for the abolition of slavery throughout the British Colonies, and for compensation to the persons hitherto entitled to the services of such slaves by the grant from Parliament of £20,000,000 sterling, passed Aug. 23, 1833.

Slavery terminated in the British possessions; 770,230 slaves became free, Aug. 1, 1834.

Slavery was abolished in the East Indies, Aug. 1, 1838.

In 1853 John Anderson, a runaway slave, killed Septimus Digges, a planter of Missouri, who attempted to arrest him, and escaped to Canada. The American government claimed him as a murderer. The Canadian judges deciding that the law required his surrender, Mr. Edwin James, Q. C. (Jan. 15), obtained a writ of *habeas corpus* for his appearance before the Queen's Bench, and Anderson was discharged on technical grounds.

English Government Commission, consisting of Chief Justice Cockburn and others, reported against permitting the return of slaves to their owners, June 13, 1876.

New Admiralty instruction orders issued by English government, directing that fugitive slaves be received, but not given up; that sea captains use their discretion, so that breach of international faith shall be avoided, Aug. 10, 1876.

SUPPRESSION OF SLAVE-TRADE BY OTHER FOREIGN COUNTRIES.

Slave-trade abolished by Austria in 1782.

French convention declared against all slave-traffic (1794). The allies at Vienna declared against it, February, 1815. Napoleon, in the Hundred Days, abolished the trade, March 29, 1815.

English treaty for its suppression with Spain, 1817; with the Netherlands, May, 1818; with Brazil, November, 1826.

In June, 1857, the French government gave permission to M. Regis to convey free negroes from Africa to Guadeloupe and Martinique, French colonies. This having led to abuses and consequent troubles, was eventually given up in January, 1859.

EMANCIPATION OF SLAVES IN THE UNITED STATES.

The Massachusetts Supreme Court decided that the "Bill of Rights," declaring that "All men are born free and equal," is a bar to slaveholding in that State (1783).

Congress unanimously passed an ordinance "for the government of the territory to the northwest of the Ohio," containing an "unalterable" provision forbidding slavery or involuntary servitude in the said territory, July 13, 1787.

Missiana, in which slavery existed, was purchased in 1803. The *Missouri Compromise* (drawn by Henry Clay, of Kentucky), was passed by Congress, permitting slavery in Missouri, but prohibiting it in all States thereafter to be created west of the Mississippi River and north of 36° 30' north latitude, March 3, 1820.

California admitted as a State, but the "Fugitive Slave Act," passed, 1850.

The "Kansas-Nebraska Bill" passed, leaving the people of those Territories to decide whether they should be organized as slave States (1854).

The judgment in the Dred Scott case rendered by the U. S. Supreme Court. Dred Scott was claimed as a slave in a free State; four judges declared for his freedom, five against it, causing great dissatisfaction throughout the Free States, March, 1857.

John Brown's failure (at Harper's Ferry) to destroy slavery by creating a slave revolution, Oct. 16, 1859.

Abraham Lincoln elected President of United States, Nov. 4, 1860.

South Carolina passed the ordinance of secession, 1860. Slavery abolished in District of Columbia, April 13, 1862.

President Lincoln issued his proclamation declaring the abolition of slavery in the Southern States, to take effect Jan. 1, 1863, provided that those States have not returned to the Union, Sept. 22, 1862.

President Lincoln proclaims the freedom of all slaves in the Southern States, except in parts held by the U. S. Army, Jan. 1, 1863. Congressional action needed to give it effect, in the latter part of the year.

Fugitive Slave act repealed by Congress, June 13, 1864.

The Confederate Congress decreed the arming of the slaves, Feb. 22, 1865.

Surrender of the Confederate Army under Gen. Lee, April 9, 1865.

Union flag replaced on Fort Sumter, April 14, 1865.

President Lincoln assassinated, April 15, 1865.

Several Southern States pass an ordinance annulling secession and abolishing slavery, September, October, and November, 1865.

President Johnson vetoed the Freedman's Bureau Bill, Feb. 1, 1866, and also the bill for securing to the colored people civil rights equal in all respects to those of the whites, March 27, 1866.

Congress passed the "Equal Rights Bill" over the President's veto, April 9, 1866.

Bill giving to colored persons in the District of Columbia the full right of suffrage, passed Dec. 13, 1866.

ABOLITION OF SLAVERY IN OTHER COUNTRIES.

Serfdom in Prussia abolished by Frederick I. in 1702.

Serfdom in Denmark abolished by Christian VII, 1766.

Serfdom in Germany abolished by Joseph II, 1789.

Slave-trade abolished in Jamaica, May 1, 1807.

All slaves in Jamaica emancipated, Aug. 1, 1834.

Slavery abolished in Dutch West Indies, July 1, 1861.

Decree issued in Brazil declaring that all children born hereafter to slaves shall be free, and that all slaves shall be free 20 years later, Sept. 27, 1871.

Decree issued in Brazil declaring all slaves to be free by enlisting in the army, from November, 1871.

Porto Rico issued decree abolishing slavery, March 23, 1873.

Portugal issued decree suppressing slavery in the colonies of St. Thomas, etc., February, 1876.

Spanish Senate voted gradual emancipation, Dec. 24, 1879; same bill passed by Deputies, Jan. 21, and act promulgated, Feb. 13, 1880.

Egypt issued decree abolishing slavery, July 31, 1881.

Russian decree abolishing serfdom in the imperial domains issued by Nicholas I. in 1842.

Imperial edict providing for the entire abolition of serfdom in the whole Russian empire, proclaimed by Alexander II, March 3, 1861. The following numbers are from Marshall's tables:

RUSSIAN SERFS EMANCIPATED IN 1861.

	Male.	Female.	Total.
Crown serfs.....	11,168,000	11,683,000	22,851,000
Appanage.....	1,624,000	1,702,000	3,326,000
Held by nobles.....	10,674,000	11,081,000	21,755,000
Total.....	23,466,000	24,466,000	47,932,000

NOBLEMEN'S SERFS IN 1861.

Nobles.	Serfs.	Average.
23,100	18,575,000	802
36,150	2,520,000	70
43,800	660,000	15
103,050	21,755,000	211

COST OF REDEMPTION.

Mortgages remitted.....	\$152,000,000
Government scrip.....	101,150,000
Appanage.....	52,330,000
Paid by serfs.....	19,500,000
Balance due.....	\$325,000,000

Indemnity award..... \$325,000,000

The indemnity to the nobles was about \$15 per serf. The lands were mortgaged to the state until 1912. The lands ceded to crown serfs were mortgaged only till 1901. The above item of "mortgages remitted" is the amount due by nobles to the Imperial Bank and canceled.

LANDS HELD BY FREED SERFS IN 1879.

Title.	Holders.	Acres.	Average Acres.
Crown-gift.....	6,117,000	84,200,000	14
Appanage.....	1,625,000	30,200,000	18
Purchase.....	10,137,000	65,500,000	6½
Beggar-lots.....	1,840,000	6,440,000	3½
Total.....	19,719,000	186,340,000	9

In return for crown-gift the holders have to pay 50 per cent. extra poll-tax till 1902. Beggar-lots are lands given gratis by the nobles to the peasants, rather than sell farm-lots at \$5 per acre to them.

AUSTRIAN SERVITUDE (1840).

	Value.
Labor (two days a week).....	\$35,000,000
Tithe of crops, etc.....	12,000,000
Male tribute.....	1,400,000
Female tribute, spun wool.....	1,800,000
Powl, eggs, butter.....	1,000,000
Total.....	\$51,200,000

There were 7,000,000 serfs, whose tribute averaged more than \$35 per head, which was, in fact, the rent of their farms. Some Bohemian nobles had as many as 10,000 serfs. The redemption was effected by giving the nobles 5 per cent. government scrip, and land then rose 50 per cent. in value.

GERMAN SERFS.

In 1848 the state took 60,000,000 acres from the nobles, leaving them still 25,000,000 acres, and gave the former among the serfs. Indemnity as follows:

1. Government scrip, \$300 for each serf family, to nobleman.
2. Land-tax, \$15 per annum, transferred to peasant.
3. Interest, \$35 per annum for 47 years, to be paid by peasant to the state, being 4 per cent. on cost of redemption.

EMANCIPATION IN BRITISH COLONIES IN 1834.

Colonies	Number.	Indemnity.	Per Head.
Jamaica.....	311,700	\$6,152,000	\$100
Barbadoes.....	83,000	1,721,000	105
Trinidad.....	22,300	1,039,000	250
Antigua, etc.....	172,083	3,421,000	100
Guiana.....	84,900	4,237,000	265
Mauritius.....	68,000	2,113,000	155
Cape of Good Hope.....	38,400	1,347,000	185
Total.....	780,393	\$20,000,000	\$130

SLAVERY IN BRAZIL.

Provinces.	Slaves.	Population.	Slave Ratio, per cent.
Mines.....	370,400	2,039,000	18
Rio Janeiro.....	341,600	1,057,700	32
Bahia.....	167,800	4,380,000	12
San Paulo.....	156,600	837,400	19
Pernambuco.....	89,100	841,500	11
Maranhão.....	74,900	359,100	21
Rio Grande-do-Sul.....	67,800	434,800	16
Various.....	242,600	1,890,900	8
Total.....	1,510,800	9,930,400	15

There were 805,000 male and 700,000 female slaves held by 41,000 owners, averaging 37 to each owner. In 1832 the total number of slaves was 1,300,000, representing a market value of \$520,000,000. It is probable there will be no slaves remaining in 1900.

EMANUEL, or IMMANUEL, the symbolical name of the child announced by Isaiah to Ahaz and the nation, and applied by St. Matthew to the Messiah born of the Virgin.

EMBA, a river of the Asiatic Russian government of Orenberg, in the Kirghiz territory, rising at the western base of the Mugadshar Mountains, flowing southwest, and entering the Caspian Sea after a course of about 450 miles.

EMBATERION, a war song of the Spartans, which was accompanied by flutes, and which they sang marching in time, and rushing on the enemy. The origin of the embaterion is lost in antiquity.

EMBATTLED, or IMBATTLED, one of the partition lines in heraldry, traced in the form of the battlements of a castle or tower.

EMBLEM, a representation of an object intended to signify or indicate to the understanding something else than that which it directly represents to the eye. The meaning of the emblem rests upon its secondary, not its primary signification. Emblem is often used in a sense synonymous with symbol.

EMBLEMATA (Gr.), the works of art with which gold and silver vessels were decorated by the ancients. These sculptured figures were generally executed either in the precious metals or in amber. They were called crustæ by the Romans, though the Greek word was also used.

EMBLICA, a genus of plants of the natural order *Euphorbiaceæ*, having a fleshy fruit. *E. officinalis* is a tree found in most parts of India, with a crooked stem, thinly scattered spreading branches, long narrow leaves, minute greenish flowers, and a globular fruit, about the size of a gall-nut, which is a source of tannin.

EMBOUCHURE (Fr.), that part of a wind instrument to which the lips are applied to produce the sound. The term embouchure is also applied to the mouth of a river.

EMBOWED, the heraldic term for anything bent like a bow—as, for example, the arm of a man.

EMBRACERY: in the law of England, the offense of influencing jurors by corrupt means to deliver a partial verdict. Not only persons attempting to influence the jury, but also jurors themselves attempting unduly to bias the minds of their fellows, are guilty of embracery. The using of indirect means in order to be sworn as a juror is also embracery.

EMBROCATON (Gr. *en*, into, and *brecho*, I wet), the same as liniment.

EMBRYOTOMY, a division of the fetus into fragments; to extract it by piecemeal; when the narrowness of the pelvis or other faulty conformation opposes delivery.

EMBURY, PHILIP (1729–75), an Irish American preacher. He became a local preacher in 1758; in 1766 began to hold services in New York city, and

he probably presided over the first Methodist congregations formed in the United States. The first Methodist church was built under his charge in 1768, and he afterwards preached there gratuitously. He went to Salem, N. Y., in 1769, where he preached on Sunday, and worked as a carpenter during the week. He organized the first Methodist society within the bounds of what is now Troy conference.

EMERITUS, a term applied originally to a Roman soldier who had served out his time, and been discharged on something equivalent to our half-pay. It is now employed to designate certain functionaries, such as professors, who have been honorably relieved from the duties of their office, on account of infirmity or long service, and who are usually granted a retiring allowance.

EMERSON, the reappearance of one heavenly body from behind another, after an eclipse or occultation. Minutes or scruples of emersion are the arc of the moon's orbit passed over by her center, from the time she begins to emerge from the earth's shadow to the end of the eclipse.

EMERSON, RALPH WALDO, an American author, born in Boston, Mass., in 1803, died in Concord in 1882. In 1826 he was approbated to preach, and in 1829 was ordained as colleague of Rev. Henry Ware, Jr., in the pastorate of the 2nd church, Boston, and succeeded Ware within eighteen months. He resigned his pastorate in 1832, and went to Europe the following year for his health. While on this journey he met several eminent writers, and formed with Thomas Carlyle one of the most interesting friendships in literary annals. He returned to the United States in 1834, and for the succeeding three years lectured in Boston. In 1835 he moved into a house on the old Lexington road, along which the British had retreated from Concord sixty years before; and this house he made his home for the remainder of his life. For several years he had been writing poetry, but he published little until after he settled on the Lexington road, when his career became distinctively that of a literary man.

For a time he edited "The Dial," a literary journal published from 1840 to 1844, and through its columns gave to the public more than forty of his own pieces, both prose and verse. From 1847 to 1849 he traveled in Europe, and delivered many lectures on topics of the day. During the civil war he took sides with the North, and delivered several forcible lectures favoring abolition. Besides contributing to numerous periodicals he published *Nature* (1836); a volume of essays (1841); another volume (1844); volume of poems (1846); *Representative Men* (1850); *English Traits* (1856); *Conduct of Life*, a volume of essays (1860); volume of essays, entitled *Society and Solitude* (1870); and *Letters and Social Aims* (1875).

EMINENCE, a title given to cardinals by Urban VIII. Up to the period of his pontificate they had been called Most Illustrious, and Most Reverend.

EMINENCE, a town in Henry county, Ky., 28 miles west of Frankfort, in a fine blue-grass region, where farming and stock-raising are carried on. There is a valuable mineral spring here, two colleges, and also woolen and flour mills. Pop., 1,002.

EMINENT DOMAIN denotes the universal right in the public over property, by virtue of which the supreme authority in a state may compel a proprietor to part with what is his own for the public use.

EMIN PASHA, whose real name is Eduard Schnitzler, was born in 1840 at Oppeln, Silesia, educated at Neisse, and studied medicine at Breslau and Berlin. In 1864 he went to Turkey, where he quickly established a reputation as a physician. He accompanied Hakki Pasha on his official jour-

neys through Armenia, Syria, and Arabia. He went with Ismail, governor of Scutari, in his exile to Trebizond. He knew the Turkish and Arabic languages well, and had so completely adopted the habits and customs of the people that he readily passed for one of them. He adopted the name Emin, "the Faithful One," and, upon the death of Ismail (who had been restored to royal favor) he married his widow. In 1876 he joined the Egyptian service and was ordered to Khartum, and thence as chief medical officer to the Equatorial Province, of which in 1878 he was appointed governor by General Gordon. Here he was isolated and shut off from the world, and harassed by the troops of the Mahdi and by revolts instigated in the interest of the slave-trade. In 1886 news was received in England that he was still holding his post in Central Africa, and an expedition under Stanley was sent to his relief. The expedition reached Emin in May, 1888. In August, while the expedition was looking for its rear-guard, he was imprisoned by the natives, but escaped in December, and in February, 1889, rejoined Stanley, with whom he reached Zanzibar in December. The patron's medal of the Royal Geographical Society was awarded to him in 1890; in which year, also, he entered the German service and is now again in Africa.

EMMA, Queen Regent of the Netherlands (Ade-laïde Emma Wilhelmina Thérèse), was born Aug. 2, 1858, at Arolsen, the capital of Waldeck. She was married on Jan. 7, 1879, to the late William III. of Holland, by whom she has one daughter. She accepted the Regency a few days before her husband's death, when she issued a proclamation declaring her sense of the responsibility which had devolved upon her. She is one of the most popular regents in Europe.

EMMETTSBURG, a railroad junction and county-seat of Palo Alto county, Iowa, on the Des Moines River, 55 miles northwest of Fort Dodge. Flour and lumber are produced here. Population, 1,584.

EMMITTSBURG, a village of Frederick county, Md., one mile from Mason and Dixon's line. It was laid out by William Emmitt in 1773, and contains Mount St. Mary's College (Catholic), St. Joseph's Academy, and the mother-house of the Sisters of Charity in the United States. Its educational buildings are among the largest in Maryland. Population (1890), 844.

EMMONS, NATHANIEL (1745-1840), an American theologian, licensed to preach in 1769. From 1773 to 1827 he was pastor at Franklin, Mass., and during this long pastorate prepared fifty-seven young men for the ministry. He was a founder and the first president of the Massachusetts missionary society. He published many essays, sermons, and dissertations.

EMOLLIENTS (from Lat. *mollis*, soft), substances used to soften the textures to which they are applied, as poaltices, fermentations, etc., externally, and demulcents internally.

EMORY, a village of Washington county, Va., 10 miles east of Abingdon. It is the seat of Emory and Henry College.

EMORY, JOHN (1789-1835), an American M. E. bishop. In 1805 he began the practice of law, but in 1810 entered the Methodist Episcopal ministry. He was a delegate to the general conferences, with one exception, from 1816 to 1832. In 1820 he was sent to the British Wesleyan conference, and in 1832 was ordained a bishop. For a long time he managed the affairs of the Book Concern, and edited the "New York Christian Advocate." He founded the "Methodist Quarterly Review," and was active in the establishment of the University of New York, Wesleyan University and Dickinson

College. Among his works are *The Divinity of Christ Vindicated, and Defense of Our Fathers*.

EMORY COLLEGE. See COLLEGES, in these Revisions and Additions.

EMPANEL, to write in a schedule or roll the names of such jurors as the sheriff returns to pass upon any trial.

EMPECINADO, DON JUAN MARTIN DIAZ, EL (1775-1825), one of the leaders of the Spanish revolution of 1820. He entered the Spanish army in 1792. At the head of about 6,000 men he carried on a guerrilla warfare against the French during the Peninsular struggle, and acquired great distinction. In 1814 he was appointed colonel in the regular army, and the king himself created him field-marshal; but in consequence of petitioning Ferdinand, in 1815, to reinstitute the Cortes he was imprisoned and afterwards banished to Valladolid. On the outbreak of the insurrection in 1820 he took a prominent part on the side of the Constitutionalists, and on several occasions exhibited great courage and circumspection. After the triumph of the Absolutists in 1825, he was arrested and finally executed.

EMPEROR MOTH, a moth of the same family (*Bombycidae*) with the silk-worm moth, and of a genus to which the largest of lepidopterous insects belong. Its expanse of wings is about three and a half inches. Each wing is ornamented with a large, eye-like, glassy and transparent spot, and such spots are exhibited by many of the genus.

EMPIRE CITY, the county-seat of Coos county, Oregon, on Coos bay, 130 miles southwest of Salem. It exports excellent lignitic coal.

EMPIRIC, originally meaning an experimentalist or searcher after facts in Nature, came to be synonymous with vulgar ignorance. The empirics were a regular sect of ancient physicians in the time of Celsus and Galen, who give us some insight into their modes of thought and practice. They laid great stress on the unprejudiced observation of Nature, and thought that, by a careful collection of observed facts forming a history, the coincidence of many observations would lead to unalterable prescriptions for certain cases. By an empiric in medicine is now understood a man who, for want of theoretic knowledge, prescribes remedies by guess according to the name of the disease or to individual symptoms, without thinking of the constitution of the patient or other modifying circumstances.

EMPIRICAL FORMULA: in chemistry, a mode of expressing the results by elementary symbols. There are numerous compound substances, such as acetic acid, lactic acid, glucose, etc., which would all give the same result on analysis, and would be represented by the empirical formula CH_2O , or one equivalent of carbon, two equivalents of hydrogen, and one equivalent of oxygen. The very different properties of these bodies, all composed of the same elements, must be due to a different order of combination, which, to a great extent, may be represented by *rational* formula as distinguished from empirical. Acetic acid is the hydrated oxide of acetyl, or may be regarded as a molecule of water (H_2O), in which half the hydrogen is replaced by acetyl, $\text{C}_2\text{H}_3\text{O}$; and this expressed by the *rational* formula $\text{C}_2\text{H}_3\text{O} \cdot \text{O}$, but could not be implied by the empirical mode, either in the form of CH_2O , or $\text{C}_2\text{H}_4\text{O}_2$.

EMPIRICAL LAWS are such as express relationships, which may be merely accidental, observed to subsist among phenomena, or cause of the production of phenomena. They are usually tentative, and form stages in the progress of discovery of causal laws.

EMPIRICISM, the dependence for knowledge or skill on experience or experiment rather than on theory. Professor Ward, in *Dynamic Sociology*, defines empiricism as the application of superficial truths, recognized in a loose, unsystematic way, to immediate and special needs. In medicine the term is used of the dependence upon mere experience in the trial of remedies, without knowledge of the medical sciences or of the clinical observations and opinions of others. In metaphysics the theory which attributes the origin of all our ideas to sensuous experience, denying the existence of innate or *à priori* conceptions, is called empiricism. Mr. Lewes, in *Problems of Life and Mind*, says that this term, although commonly employed by metaphysicians with contempt, may be accepted, since even the flavor of contempt only serves to emphasize the distinction.

EMPORIA, a flourishing city and county-seat of Lyon county, Kan., situated in a fine agricultural region. It has a State normal school, the College of Emporia, a business college, conservatory of music, gas and electric lights, opera houses, water works, and produces various manufactures, among which are canned goods. Pop. (1890), 7,551.

EMPORIUM, a railroad junction and county-seat of Cameron county, Pa., situated 99 miles northwest of Williamsport. It has a good lumber trade, and valuable salt wells are found in the vicinity.

EMPORIUM: in Homer's time, a person who sailed in a ship belonging to another, but later a wholesale merchant as opposed to a retailer. An emporium thus came to be applied to the receptacle in which wholesale merchants stowed their goods in seaports and elsewhere, and thus corresponded to our warehouses.

EMPSON, SIR RICHARD, the unpopular agent of Henry VII. In 1491 he became Speaker of the House of Commons, and in 1504, now a knight, high steward of Cambridge University, and chancellor of the duchy of Lancaster. Throughout Henry's reign he was employed in exacting taxes and penalties due to the crown. His conduct was by the people regarded as infamous, and in the second year of Henry VIII's reign he was convicted of treason, attainted, and beheaded on Tower Hill, Aug. 17, 1510.

EMPYREAN, a word used by the old metaphysical natural philosophers to designate the highest region of light, where the purest and most rarefied elements of fire existed; and by mediæval and modern poets to indicate heaven, the source of light and the home of the blessed.

EMPYREUMA, the burned smell and acrid taste which result when vegetable or animal substances are decomposed by a strong heat. The cause of the smell and taste resides in an oil called *empyreumatic*, which does not exist naturally in the substance, but is formed by its decomposition.

EMS, a river in the northwestern part of Germany. It rises in Westphalia, at the southern base of the Teutoburger Wald, and flowing first in a northwestern, and then, through the Hanoverian territories, in a northern direction, empties itself into Dollart bay. In 1818 it was connected by a canal with the Lippe, and thus with the Rhine.

EMULSION, the term applied to those preparations in pharmacy where the product is a milky white opaque mixture, composed more or less of oily particles floating in mechanical suspension in mucilaginous liquid.

ENAREA, a country of Africa south of Abyssinia, situated within lat. 7°-9° N., and long. 36°-38° E., but its limits have not yet been definitely ascertained. It is inhabited by a portion of the Gallas tribes, who, owing to the continued commu-

nication which they keep up with Abyssinia, and also to the residence of many Mohammedan merchants among them, are much more civilized than the Gallas usually are. Their government is an hereditary and absolute monarchy. The principal rivers of Enarea are the Gibbe and the Dodesa. Its coffee plantations are extensive. It is remarkable for its manufactures of ornamented arms, and of cloths with embroidered borders. Besides these it exports slaves, gold, ivory, civet, and skins into Abyssinia. The king and a small portion of the population are Mohammedans, and it is said that native Christians have been found in Enarea. The capital is Saka, near the river Gibbe.

ENARTHROSIS, the term used by anatomical writers to express the kind of joint which admits of the most extensive range of motion. It occurs in the hip and shoulder joints, and is commonly called the ball-and-socket joint.

ENCALADA, MANUEL BLANCO, born in Buenos Ayres in 1790, died at Santiago, Sept. 5, 1876. He studied at Madrid and in the naval academy at Leon, deserted the Spanish ranks and joined the Chilean party. In 1819 he became rear-admiral, and in 1820 major-general of infantry, and in 1825 he was appointed head of the Army of Chili. He was for two months president of the Republic in 1826, governor of Valparaiso from 1847 to 1852, and minister to France from 1853 to 1858.

ENCAMPMENT (Lat. *campus*, a plain), a lodging or home for soldiers in the field. There are now four different kinds of these lodgments in use: namely, *intrenched* camps, where an army is intended to be kept some time, protected against the enemy; *flying* camps, for brief occupation; camps of *position*, bearing relation to the strategy of the commander; and camps of *instruction*, to habituate the troops to the duties and fatigues of war.

ENCEINTE, in fortification, denotes generally the whole area of a fortified place. Properly, however, it means a cincture or girdle, and in this sense the *enceinte* signifies the principal wall or rampart encircling the place.

ENCEPHALOCLELE, the term applied to a tumor projecting through the skull in one of the parts where the bones are incomplete in infancy, and consisting of a protrusion of the membranes of the brain, containing a portion of the brain itself. The most common situation of such tumors is in the middle line and at the back of the head.

ENCORE ("again"), a French expression, generally used in England by the audience of a theater or concert-room, when requesting the repetition of the performance of a piece of music. It is not used by the French themselves, who, in similar circumstances, exclaim *bis* (twice).

ENCRINAL, or **ENCRINITAL LIMESTONE**, a name given to some carboniferous limestones from the great abundance in them of the calcareous skeletons of encrinites.

ENCRINITES, fossil crinoids, often known as stone-lilies.

ENCYCLICAL, a letter addressed by the Pope to all his bishops, condemning current errors, or advising the Christian people how to act in regard to great public questions. It differs from a bull in that the latter is usually more special in its destination.

END, a familiar word concerned in some important discussions, and especially in ethics. It is generally used in the sense of the thing aimed at, the object, purpose, or goal of human action; but not infrequently to mean the close, or death.

ENDEMIC, a term applied to diseases which affect numbers of persons simultaneously, but so as to show a connection with localities as well as with

their inhabitants. Endemic diseases are usually spoken of as contrasted with epidemic and sporadic; the first term indicating that a disease infects habitually the population within certain geographical limits, and also that it is incapable of being transferred or communicated beyond those limits; while, on the other hand, a disease is termed epidemic if it is transmitted without reference to locality; and sporadic if it occurs in isolated instances only. The most marked type of an endemic disease is ague, which has the habits mentioned above, and is to so marked a degree a denizen of particular tracts of country as to lead to their being in some instances almost depopulated.

ENDICOTT, JOHN (1588-1665), a colonial governor of Massachusetts. In 1628 he took charge of the plantation at Naumkeag, now Salem, and continued to exercise the chief authority until the arrival of John Winthrop, who took charge in 1630. In 1641-44 he was deputy-governor of Massachusetts, again in 1650 and in 1654, and was governor in 1644, 1649, 1650-53, and in 1655-65. In 1645 he became sergeant major-general of the colony, and in 1685 president of the colonial commissioners.

ENDICOTT, WILLIAM CRONINSHIELD, an American statesman, was born at Salem, Massachusetts, in 1827. He graduated at Harvard University 1847. He then studied law for three years and was admitted to the bar in 1850. He continued the practice of the law until 1873, when he was raised to the bench of the Massachusetts Supreme Court, which position he resigned in 1882. In 1884 he was the Democratic candidate for Governorship of Massachusetts, but was not elected. He was appointed Secretary of War by President Cleveland, in March, 1885.

ENDOMORPH, the name given to a mineral which is inclosed within another mineral, the latter being termed a *perimorph*.

ENDORSE: in heraldry, an ordinary containing the fourth part of a pale. *Endorsed*, again, or *indorsed*, signifies that objects are placed on the shield back to back.

ENDOSMOSE and **EXOSMOSE**, terms applied to the transfusion that takes place when two liquids or two gases of different densities are separated by an animal or a vegetable membrane. This action performs a very important part in living organisms, and explains many phenomena of the circulation of sap and the processes of nutrition, which were previously referred only to the wonderful action of vital energy. The term *osmose*, or *osmotic action*, is now preferred.

ENEMA, a medicine or fluid substance, conveyed into the body by injection, usually through the rectum or lower bowel.

ENERGICO, an Italian term in music, meaning with energy and force; with strong articulation and accentuation, and a marked powerful delivery of the single notes, without losing in distinctness of execution.

ENFIELD, a village of Grafton county, N. H., 42 miles northwest of Concord. The place is a summer resort and a portion of the inhabitants are members of the United Society of Shakers; they manufacture pails, tubs, and brooms, and raise garden-seeds. There are also manufactories of furniture, leather, knit-goods, and carriages.

ENFIELD, a village of Halifax county, N. C., 144 miles from Wilmington. It exports large quantities of cotton, lumber, staves, peaches, wine, shingles, and brick. There is a gold mine in the vicinity.

ENFRANCHISE, **ENFRANCHISEMENT**, to make free; the admission to certain liberties or privileges. Thus, a person made a denizen of the

country, or receiving the freedom of a city or burgh, is said to be enfranchised.

ENGELBERG, a village of Switzerland in the canton of Unterwalden, at the foot of Mount Titlis. It has a famous school library, valuable paintings, and an extensive cheese-cellar.

ENGELHARDT, JOHANN GEORG VEIT, a learned German theologian, born at Neustadt, on the Alsch, Nov. 12, 1791, died Sept. 13, 1853. He studied at Erlangen, where in 1820 he was appointed extraordinary professor, and in 1822 ordinary professor in theology. In the course of his life he wrote many learned dissertations in the *Journal of Historical Theology*.

ENGELMANN, GEORGE (1809-84), an American botanist. He studied in Germany and in France, and in 1832 emigrated to the United States. He settled in St. Louis, and soon became prominent as a physician. In 1836 he started "Das Westland," a German newspaper, which gained high reputation in the United States and in Europe. About this time he became distinguished as a botanist, and contributed many articles to the American Academy of Arts and Sciences, and to the Government reports. He was a member of several scientific societies.

ENGLEWOOD, a railroad junction of Cook county, Ill., 7 miles south of Chicago. It contains a school for the training of school teachers.

ENGLEWOOD, a village in Bergen county, N. J., 14 miles north of New York city, and near the palisades of the Hudson River.

ENGLISH, THOMAS DUNN, a lawyer, born in Philadelphia, Pa., June 29, 1819. He was educated at the University of Pennsylvania, graduating with the degree of M. D. in 1839. He entered the profession of law in Philadelphia in 1842, and received the degree of LL.D. from William and Mary College in 1876. In politics he is a Democrat. He was elected member of the New Jersey State legislature in 1863 and 1864. In 1890 he was elected a Representative from the Sixth Congressional district of New Jersey to the 52d Congress, and was returned to the 53d Congress by the same constituency.

ENGLISH, JAMES EDWARD, born in New Haven, Conn., March 13, 1812, sat in the State legislature 1855-58. He was elected to Congress as a war Democrat in 1861 and served four years. From 1867 to 1870 he was governor of Connecticut and in 1875-76 served as United States senator. He was afterward chairman of the national Democratic committee, and died March 2, 1890.

ENGLISH, WILLIAM HAYDEN, born at Lexington, Ind., August 27, 1822; was elected to Congress as a Democrat in 1852 and served from 1853 to 1861. In 1880 he was the Democratic candidate for the vice-presidency on the ticket with General Hancock, and suffered defeat with him.

ENGRAILED: in heraldry, a line composed of a series of little semi-circular indents, with the points turned outwards and upwards.

ENGROSSING A DEED, writing it out in full and regular form on parchment or paper for signature.

ENGUICHÉ, a hunting horn, the rim around the mouth of which, being of different color from the horn itself, is said in heraldry to be enguiché, of the color in question.

ENNEMOSER, JOSEPH, a medico-philosophic writer, born at Hintersee, in the Tyrol, Nov. 15, 1787, died in 1854. He commenced his academic studies at Innsbruck in 1806. On the rising of the Tyrolese against the French in 1809 Ennemoser honorably distinguished himself in battle on several occasions. In 1816 he took the degree of

Doctor of Medicine, and in 1819 was made professor of medicine at the new University of Bonn. In 1841 he went to Munich, where he obtained a great reputation by the application of magnetism as a curative power.

ENOCHS, WILLIAM H., a lawyer, born in Noble county, Ohio, March 29, 1842. He received a common-school education; entered the Union army as a private at the outbreak of the war of the Rebellion, and was mustered out a brigadier-general. He was three times severely wounded. He studied law and entered the profession in 1867 at Ironton. In politics he is a Republican, and has served as prosecuting attorney of Lawrence county, and as a member of the Ohio State legislature. In 1890 and 1892 he was elected a Representative from the Twelfth District of Ohio.

ENSEMBLE (Fr.) the general effect produced by the whole figures or objects in a picture, the persons and plot of a drama, or the various parts of a musical performance.

ENSILAGE. See SILO, *Britannica*, Vol. XXII, p. 67.

ENTADA, a genus of leguminous climbing shrubs (sub-order *Mimoseæ*) having pinnate or bipinnate leaves, and being remarkable for their great pods, in which the egg-sized seeds lie amid a gelatinous substance. These pods are sometimes fully five feet long, and six inches broad.

ENTELLUS MONKEY, or LONUMAN (*Semopithecus entellus*), an East Indian species of monkey, with yellowish fur, face of violet tinge, surrounded with projecting hairs, long limbs, and very long muscular and powerful—though not prehensile—tail. It is held in superstitious reverence by the Hindoos.

ENTENTE CORDIALE, a term which originated, according to Littré, in the French chamber of deputies in 1840-41, and which has been used especially to denote the friendly relations and disposition existing between France and Great Britain.

ENTERITIS, inflammation of the bowels, and especially of their muscular and serous coat, leading to constipation and pain, with colic, and sometimes ileus. Enteritis is distinguished from these last affections, indeed, only by the presence of inflammatory symptoms—that is, pain, tenderness, fever, etc., from a very early stage of the disease, and in so decided a form as to require special attention. The disease is one of great danger, and should never be incautiously treated with domestic remedies. It is closely allied to peritonitis, and often depends upon internal mechanical causes, or on external injury.

ENTEROPNEUSTA, a class of worm-like animals, including Balanoglossus and Cephalodiscus. It is of great zoological importance, because of the characters in which the members resemble vertebrates.

ENTERPRISE, a winter resort, and county-seat of Volusia county, Fla., situated at the head of steamboat navigation on St. John's River, 80 miles south of St. Augustine. "Green Spring," a noted sulphur spring, 80 feet in diameter and 100 feet deep, is located here.

ENTOMOSTRACA, a general name for the lower orders of Crustacea, including Phyllopoda, Ostracoda, Copepoda, and Cirripedes.

ENTOPHYTES, a term employed to denote those parasitic plants which grow on living animals.

ENTR'ACTE: in music, an instrumental piece, composed in the form of a little symphony or overture, to be performed between the acts of a play.

ENTRÉ DOURO e MINHO, a province in the extreme northwest of Portugal, consisting of three

districts—Braga, Vianne, and Porto, with the town of Braga for the capital.

ENTRE RIOS (*Sp.*, between rivers), an Argentine State, which takes its name from its occupying the space between the Parana and the Uruguay, immediately above the point where they unite to form the Rio de la Plata. The area is estimated at 32,000 square miles. Population, about 160,000. The capital is Entre Rios, with a population of 16,000.

ENTRESOL, a low story between two main stories of a building, generally above the first story. *Mezzanine* is another name for the entresol.

ENTROPIUM, or ENTROPION, inversion of the eyelashes, or even eyelid, consequent either on loss of substance, or on inflammatory swelling of the lid.

ENTRY: in law, taking possession of lands or tenements by entering or setting foot upon them; also, the entering into a building unlawfully, as in housebreaking or burglary.

ENTRY, RIGHT OF. A person is said in law to have a right of entry who has been wrongfully dispossessed or ousted of land and tenements by abatement, intrusion, or disseizin. See the several articles under these heads.

EPACRIDACEÆ, a natural order of exogenous plants, consisting of shrubs and small trees, which, both in appearance and in botanical character, much resemble the *Ericaceæ*, or heath family. The most important distinguishing structural character is found in the simplicity of the anthers, which are one-celled, open longitudinally, and are destitute of appendages. The flowers of the *Epacridaceæ* have generally a tubular corolla dividing into five segments, which sometimes become separate petals. The calyx is persistent, often colored, has the same number of segments with the corolla, and is surrounded with small bracts. The stamens are fewer than in the *Ericaceæ*, usually equal in number to the segments of the corolla, and alternate with them. The fruit is sometimes a capsule, sometimes a berry, sometimes a drupe. The leaves are simple, generally alternate, often crowded; the flowers in spikes, in terminal racemes, or axillary and solitary. About 400 species of the *Epacridaceæ* are known, all natives of the Indian archipelago, the South Sea Islands, and Australia.

EPAULETTE, a shoulder-knot worn by commissioned officers in the naval profession, both as an ornament and a distinction.

EPEIRA, a genus of spiders, the type of a family called *Epeiridæ*. They are of those spiders which have only a pair of pulmonary sacs and spiracles; construct webs with regular meshes, formed by concentric circles and straight radii; and are furnished with a pair of almost contiguous eyes on each side, other four eyes forming a quadrangle in the center.

EPES, JAMES F., a lawyer, born in Nottoway county, Va., May 23, 1842. He was educated in the common schools and at the University of Virginia; was a cavalryman in the Confederate army during the war of the Rebellion; studied law in the Washington and Lee University, and entered the profession of law in 1867. In politics he is a Democrat, and was attorney for the Commonwealth from 1870 to 1882. In 1890 he was elected a Representative from the Fourth Congressional District of Virginia to the 52d Congress. In 1892, Mr. Epes again became a candidate, and being re-elected from the same district took his seat in the 53d Congress.

EPHEMERES, a name applied to almanacs from their containing notices of each day. It is mostly confined to astronomical tables giving the daily

places of the sun, moon, and planets, and other phenomena of the heavens.

EPHOD, a vestment worn by the Jewish high-priest. It consisted of two shoulder-pieces, one covering the back, the other the breast and upper part of the body. Two onyx stones set in gold fastened it on the shoulders, and on each of the stones were engraved the names of six tribes, according to their order. A girdle or band, of one piece with the ephod, fastened it around the body. Just above this girdle, in the middle of the ephod, and joined to it by little gold chains, rings, and strings, rested the square oracular breastplate with the mysterious *Urim* and *Thummim*.

EPI, or GIROUETTE, a species of light, ornamental finial of ironwork or terra-cotta with which pointed roofs or the tops of spires are sometimes surmounted.

EPIDEMIC, a disease which attacks numbers of persons in one place, simultaneously or in succession, and which in addition is observed to travel from place to place, often in the direction of the most frequented line of communication.

EPICYCLOID, the name of a peculiar curve. When a circle moves upon a straight line, any point in its circumference describes a cycloid; but if the circle moves on the convex circumference of another circle, every point in the plane of the first circle describes an epicycloid, and if on the concave circumference a hypocycloid. The circle that moves is the generating circle; the other, the base.

EPIGASTRIUM, the part of the abdomen which chiefly corresponds to the situation of the stomach, extending from the sternum towards the navel or umbilicus, and bounded on each side by the hypochondria. It is called, in popular language, the pit of the stomach.

EPIGENE, a term applied to those geological agents of change which affect chiefly the superficial portions of the earth's crust, as the atmosphere, water, plants, and animals.

EPIGLOTTIS, a cartilaginous valve, which partly closes the aperture of the larynx.

EPILOBIUM, a genus of plants of the natural order *Onagraceæ*, having four deciduous calycine segments; four petals; a much elongated, four-sided, four-celled, four-valved, many-seeded capsule; and seeds tufted with hairs at one end. The species are herbaceous perennials, natives of temperate and cold countries, and very widely diffused both in the Northern and in the Southern hemispheres.

EPISCOPAL CHURCH, PROTESTANT. See Britannica, Vol. VIII, p. 943. See also RELIGIOUS DENOMINATIONS, in these Revisions and Additions.

EPISTLE. The lesson in the church service called the Epistle derives its name from being most frequently taken from the Apostolic Epistles, although it is sometimes also taken from other parts of Scripture.

EPISTLE SIDE OF THE ALTAR, the left side of the altar or communion table, looking from it, at which in the church service the epistle of the day is read. It is of lesser distinction than the right or Gospel side, and is occupied by the clergyman of lower ecclesiastical rank.

EPISTOLÆ OBSCURORUM VIRORUM, the title of a collection of satirical letters which appeared at the commencement of the 16th century, and professed to be the composition of certain ecclesiastics and professors in Cologne and other places in Rhenish Germany. They were directed against the scholastics and monks, and lashed with merciless severity their doctrines, writings, morals, modes of speech, manner of life, follies and extravagances, and thus helped in no small degree to bring about the Reformation.

EPIZOA, animals that live on the bodies of other organism in various degrees of parasitism.

EPIZOOTIC, or **EPIZOOTY**, any disease temporarily prevalent among the lower animals; especially the influenza when thus prevalent among horses or other domestic animals. Many of the epidemics of influenza, nearly one hundred of which have occurred since the beginning of the 16th century, have been accompanied by similar disorders among horses, cows and dogs. About 16,000 horses were attacked by it in New York during the prevalence of the pestilence in 1872. See *Britannica*, Vol. XIII, p. 73.

EPODE, the last part of the chorus of the ancient Greeks, which they sung after the strophe and antistrophe, when the singers had returned to their original place. The epode had its peculiar measure of syllables and number of verses.

EPONYM, a mythical personage created to account for the name of a tribe or people.

EPROUVETTE, a machine for testing the strength of gunpowder. The ordinary eprouvette is an instrument shaped like a small pistol without a barrel, and having its breach chamber closed by a flat plate connected with a strong spring. On the explosion of the powder against the plate, it is drawn back to a distance indexed according to the strength of the powder, and is retained at its extreme state of propulsion by a ratchet-wheel.

EPWORTH, a town in the northwest of Lincolnshire, England, 30 miles north-northwest of Lincoln, distinguished as the birthplace of John Wesley, the founder of Methodism, as also of Kilham, founder of the Methodist New Connection. Population, about 2,300.

these societies into one new organization, to be called the Epworth League, whose object is "to promote an earnest, intelligent, practical, and loyal spiritual life in the young people of the church, to aid them in constant growth in grace and in the attainment of purity of heart." The success attending the organization has been extraordinary. In less than two years 5,000 local chapters have been enrolled, with a total membership of about 300,000. The general organization includes District, Annual Conference, and General Conference District Leagues. The management rests with a board of control, five of whom are chosen by the bishops, five by the managers of the Tract Society, five by the managers of the Sunday-school Union, and two are elected by each General Conference district. The plan of local organization is clearly represented by the accompanying diagram, known as the Epworth wheel.

In this wheel is shown the president surrounded by his cabinet, each member of which is the chairman or head of a department. Each cabinet officer has associated with him in the conduct of his department a committee of three or five, nominated by himself and confirmed by the League. The president must be a member of the M. E. church, and the remaining officers are to be of good moral character, but all must be approved by the Quarterly Conference. A pledge is provided, but its adoption by local chapters is made altogether voluntary. The general headquarters of the League are at 150 Fifth Avenue, New York.

EQUABLE MOTION, that by which equal spaces are passed over in equal time.

EQUATOR, **TERRESTRIAL**, the great circle on the earth's surface dividing the earth into the Northern and Southern hemispheres, and being half way between the poles.

EQUERRY: in the household of British sovereigns, an official in the department of the Master of the Horse, whose duty it is to accompany the sovereign when riding in state. The royal princes have also equerries.

EQUESTRIAN ORDER, or **EQUITES**, a body which originally formed the cavalry of the Roman army, and is said to have been instituted by Romulus, who selected from the three principal Roman tribes 300 equites.

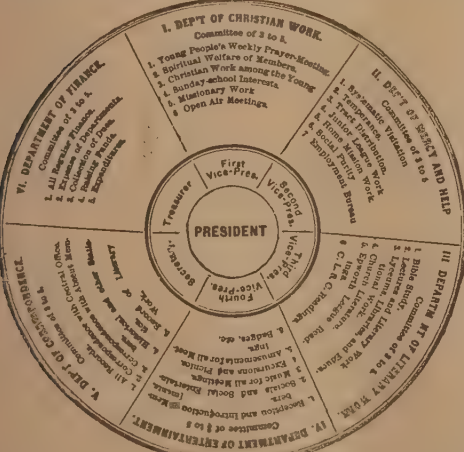
EQUESTRIAN STATUE, the representation of a man on horseback. Equestrian statues were awarded as a high honor to military commanders and persons of distinction in Rome, and latterly were chiefly restricted to the emperors, the most famous in existence; the only ancient equestrian statue in bronze being that of the Emperor Marcus Aurelius, which now stands in the piazza of the capital at Rome.

EQUIANGULAR, having equal angles. A figure is said to be equiangular whose angles are all equal to one another, as a square or any regular polygon. Also triangles and other figures are said to be equiangular one with another whose corresponding angles are equal.

EQUILATERAL, having equal sides. A square is equilateral. The equilateral hyperbola is that whose axes and conjugate diameters are equal.

EQUINOCTIAL, the same as the celestial Equator. The equinoctial and the ecliptic intersect. Equinoctial time is time reckoned from the moment in each year when the sun passes the vernal equinox. This instant is selected as a convenient starting-point of a uniform reckoning of time for the purposes of astronomical observers.

EQUINOCTIAL GALE, or **STORM**, a gale or storm that happens at or near the time of the equinox, in any part of the world. It is a wide-



EPWORTH LEAGUE, a young people's society connected with the Methodist Episcopal church. In April, 1891, it was the strongest denominational young people's society in existence, and its growth had been phenomenal. In May, 1889, a conference of all the general young people's societies of the M. E. church assembled in Cleveland, Ohio. Accredited delegates were present from the Young People's Methodist Alliance, the Oxford League, the Young People's Christian League, the Young People's Methodist Union, and the Young People's Methodist Alliance of the North Ohio Conference. The result of this meeting was the merging of

spread belief that gales and storms are more frequent about the time of the spring and autumn equinoxes, but this belief is unsupported by the records of careful observations.

EQUIPMENT, EQUIPAGE: in military matters, names given to certain of the necessities for officers and soldiers.

ERASED and ERADICATED, in heraldry, signifies that an object is plucked or torn off, and showing a ragged edge.

ERASURE, or RAZURE, the scraping or shaving of a deed or other formal writing.

ERCKMANN-CHATRIAN, the compound name of two French romancists, whose stories of Alsatian peasant life are known the whole world over. Émile Erckmann was born May 20, 1822, and Alexandre Chatrian Dec. 2, 1826. Their literary partnership dates from 1848. Chatrian died in 1890.

ERDMAN, AXEL JOACHIM, a Swedish geologist, born Aug. 12, 1814, died Dec. 1, 1869. He published *Lärobok, Mineralogien* (1853), *Vägledning till bergarternas Kännedom* (1855), and *Bidrag till Kännedom om Sveriges quartära bildningar* (1868).

ERDMANN, JOHANN EDUARD, a German philosopher, born at Wolmar in Livonia, Russia, in 1805, died in 1887. He studied at Dorpat and Berlin, and became professor of philosophy at Halle in 1839. He wrote several works on philosophy, psychology, logic and metaphysics.

EREBUS, MOUNT, an active volcano on Victoria Land, in 78° 10' south latitude, rising 12,367 feet above the sea. It was discovered in 1841 by Ross, in command of the *Erebus* and *Terror*, who named it after one of his vessels.

ERGASTERIA, a mining town in the Greek monarchy of Attica and Bœotia, near Cape Colonna, with ancient lead and silver works, reopened in 1864. Population, 6,500.

ERICACEÆ, or HEATHS, a large, widely distributed order of corallifloral dicotyledons, chiefly small shrubs, frequently evergreen and social in growth, covering large areas, especially in mountainous regions and on tablelands.

ERICSSON, JOHN (1803-89), a Swedish-American engineer. At the age of 12 he became a leveller at the grand Swedish ship canal, and two years later was engaged in setting out the work of a section employing 600 soldier operatives. In 1820 he became an officer of engineers in the Swedish army, and soon after received the appointment on the survey of Northern Sweden. In 1827 he resigned from the army, and spent the remainder of his life in experimenting and inventing. In 1839 he came to the United States. He made numerous valuable inventions in machinery; but he is best known to the public world as the designer and builder of the partially submerged war vessel, the *Monitor*, which defeated the Confederate iron-clad *Merrimac*, March 9, 1862. This victory undoubtedly turned the tide of naval warfare in favor of the North, and at once gained for the inventor of the novel and ingenious battleship, a worldwide reputation as a naval engineer. In 1883 he erected in New York a "sun motor," having made many early experiments for developing power direct from the sun. Captain Ericsson died in New York city on March 5, 1889, and in compliance with his expressed wish his remains were carried to Sweden.

ERICSSON, NILS, a Swedish engineer, brother of John Ericsson, was born Jan. 31, 1802, died at Stockholm, Sept. 8, 1870. In 1832 he became major in the engineering corps of the Swedish army; was afterwards head of the mechanical corps in the navy; and from 1855 to 1863 had charge of the construction of Swedish railroads. He was also engineer of the Saima canal in Finland, and of

the locks near Stockholm and at Trollhättan. In recognition of his services he was knighted in 1854, and in 1860 was made a baron.

ERIE, a city and county-seat of Neosho county, Kansas.

ERIE, a city of Pennsylvania, and county-seat of Erie county (see *Britannica*, Vol. VIII, p. 522). The city has an area of six square miles, with 150 miles of streets, wide, well paved and lighted. Many of the streets are paved with Medina stone and asphalt, and lined with elegant mansions, surrounded by beautiful gardens and shrubbery. On State street are handsome fountains, and a soldiers' monument, costing \$10,000. An elaborate system of water works supplies the city with an abundance of pure water. The stand-pipe at the pumps is 251 feet high, said to be the highest water pipe in the world. The Government building, completed in 1889, is a notable structure, 114x72 feet, built of stone and granite. The city hall is 64x124 feet, 88 feet in height, and cost \$300,000. The court-house is 61x132 feet, and cost \$60,000. The addition is now (1891) being constructed, at a cost of \$50,000. Charitable institutions are: Soldiers' and Sailors' Home, Home for the Friendless, Hamot Hospital, and St. Vincent's Hospital. An excellent system of public schools is maintained. The Central High School building is 270x120 feet, seats 1,500 pupils, and cost \$100,000. Other educational institutions are: Clark's Business College, the Erie Academy, the Erie Art School, and St. Benedictine (Roman Catholic) Academy. Erie is an important manufacturing center, and the market for a rich farming country. Population in 1880, 27,757; in 1890, 39,699.

ERIE, CANAL. See **CLINTON, DEWITT**, *Britannica*, Vol. VI, p. 7.

ERIE, LAKE. See *Britannica*, Vol. XIV, pp. 216-22; Vol. XVII, p. 451; Vol. XXI, pp. 179, 182.

ERIES. See **INDIANS, AMERICAN**, in these Revisions and Additions.

ERIGERON, a genus of plants of the natural order *Compositæ*, sub-order *Corymbifere*, having heads (flowers) of many florets, the florets of the ray numerous, in several rows, of a different color, from those of the disc. *Erigeron Philadelphicus*, a native of North America, with pale purple ray, and a fetid smell, is valued in the United States as a diuretic.

ERIOCAULACEÆ, a natural order of endogenous plants, nearly allied to *Restiaceæ*, and containing about 200 known species, many of which are aquatic or marsh plants. The *Eriocaulaceæ* are chiefly natives of the tropical parts of America and Australia.

ERIODENDRON, a genus of trees of the natural order *Sterculiaceæ*, natives of tropical countries. Their thick woody capsules contain a kind of wool surrounding the seeds. They are sometimes called Wool-Trees, or silk-cotton trees.

ERITH, a town of Kent, on the banks of the Thames, 15½ miles by rail east of Charing Cross. It is a summer resort for Londoners, and the headquarters of several yacht clubs. It has a much restored church, rich in brasses. At Erith the *Grace de Dieu* was built in 1515. Population of parish, about 10,000.

ERMELAND, or ERMLAND, one of the eleven districts of the old province of Prussia, extending inland from the Frisches Haff. In 1250 it was created one of the four bishoprics of the country of the Teutonic Knights. In 1354 the bishop of Ermeland, who had been subject to the archbishop of Riga, was made directly dependent upon the Pope, and elevated to the position of a prince of the empire. In 1466 West Prussia was transferred to Poland, and the bishop of Ermeland became a member of the

Polish senate. Since 1722 Ermeland and its bishop have again been Prussian.

ERMENONVILLE, a village in the southeast of the department of Oise, in France. It is celebrated for its beautiful and extensive parks, and as being the resting-place of Rousseau. It was also the residence of Gabrielle d'Estrées, the mistress of Henry IV, who inhabited a hunting-tower, part of which is still standing, and bears his name. Ermenonville was purchased by Stanislaus de Girardin, and is preserved for the lovers of art, of Nature, and of historical monuments.

ERNEST II (Duke of Saxe-Coburg and Gotha), **AUGUSTUS-ERNEST CHARLES JOHN LEOPOLD ALEXANDER EDWARD**, who reigns as Ernest II, was born June 21, 1818, succeeded his father Jan. 29, 1844, and married the Princess Alexandrina, daughter of the late Grand Duke Leopold of Baden, brother of the late Prince Consort, May 8, 1842. In 1863 his name was put forward as a candidate for the vacant crown of Greece, but for state reasons he declined it. Duke Ernest, who has labored to promote German unity, gave the stimulus to those liberal movements which induced the Emperor of Austria to make concessions to his subjects. He is an accomplished musician, and has composed several operas which have been produced in Germany with success.

ERRETT, ISAAC (1820-88), an American clergyman. He was a follower of Alexander Campbell, and in 1840 became a preacher. He was pastor in Pittsburgh, Pa., in New Lisbon, Warren, and North Bloomfield, Ohio, in Detroit, Muir and Ionia, Mich., and in Chicago. In 1866 he began the publication of "The Christian Standard," in Cleveland, and in 1868 became the president of Alliance College, but soon resigned to establish the "Christian Standard" in Cincinnati. He was corresponding secretary of the Ohio Christian Missionary Society in 1853-56, and its president in 1867-70; was corresponding secretary of the General Christian Missionary Society in 1857-60, and president in 1874-76, and was president of the foreign mission society in 1875-86.

ERRHINES, medicines administered locally to produce sneezing and discharge from the nostrils, in catarrh, and in various disorders of the head and eyes. Common snuff, and various other vegetable irritants in powder, have been used for this purpose.

ERYNGO, a genus of plants of the natural order *Umbellifera*, having simple umbels, which resemble the heads of composite flowers, a leafy involucre and leafy calyx, and obovate, scaly fruit destitute both of ridges and vittæ. The species are numerous, mostly natives of the warmer temperate parts of the world, with alternate, simple or divided leaves, which have marginal spines.

ERYSIMUM, a genus of plants of the natural order *Crucifera*, tribe *Sisymbriæ*. The pod is four-sided. *Erysimum cheiranthoides*, a branching annual about 18 inches high, with lanceolate, scarcely toothed leaves, and small yellow flowers, is found in North America and many parts of Europe. Some of the plants formerly referred to as *Erysimum* are now included in other genera, as *Sisymbrium* and *Alliaria*.

ERYTHRONIUM, a genus of bulbous-rooted plants of the natural order *Liliaceæ*, with drooping flowers and the segments of the perianth reflexed. *Erythronium dens canis*, the Dog-Tooth VIOLET, so called from the resemblance of its little white bulbs to dog's teeth, is well known.

ERYTHROPHLÆUM, a genus of leguminous trees, sub-order *Mimoseæ*. One species, a native of Guinea, contains a red juice used for poisoning ar-

rows, and also in ordeals. The tree sometimes attains a height of 100 feet.

ERYTHROXYLACEÆ, a natural order of exogenous trees or shrubs, allied to *Malpigiaceæ*. Nearly 100 species are known, natives of warm countries, chiefly of tropical America.

ESBJERG, a port of Denmark, 56 miles west of Fredricia by rail, with a large export trade in cattle, mostly to England. Its harbor, the only one of importance on the west coast of Jutland, was constructed by the state at great expense in 1868-74.

ESCALADE: in siege operations, a mode of gaining admission within the enemy's works. It consists in advancing over the glacis and covert-way; descending, if necessary, into the ditch by the means of ladders, and ascending to the parapet of the curtain and bastions by the same ladders differently placed. The leaders of an escalade constitute a "forlorn hope."

ESCANABA, or **ESCANAWBA**, a city, the county-seat of Delta county, Mich. It is at the north end of Green Bay, has a good harbor, and does a large shipping business, sending out annually 500,000 tons of Lake Superior iron ores. Population, 6,808.

ESCAPE: in law, the evasion of legal restraint; departure from the custody of a sheriff or other officer, or transcending the limits of confinement without due process of law. The term is used also of the liability of a sheriff for suffering a prisoner to escape.

ESCARP: in fortification, the side or slope of the ditch next the rampart, and of the parapet itself. When the ditch of a fortress is dry the escarp is usually faced with mason-work to render it difficult of ascent, and behind this facing there are often passages or casemates for defense. The escarp is always made at as large an angle as the nature of the soil will allow.

ESCARPMENT, a long line of cliff formed by the outcrop of a relatively hard stratum of rock imbedded among more yielding strata, the inclination of which is generally gentle. This structure is the result of denudation; the hard rock projects because it has yielded less readily to the agents of erosion.

ESCARS, large heaps of gravel, consisting chiefly of carboniferous limestone, that were accumulated during the Pleistocene period. They occur in central Ireland, but are identical with the *ösar* of Sweden, and are known also under the name of *kames* in Scot. ind. The gravel is often heaped into narrow ridges, 40 to 80 feet high and from 1 to 20 miles long.

ESCHAR, a slough or portion of dead or disorganized tissue. The name is commonly applied to artificial sloughs produced by the application of caustics.

ESCHELLES, LES, a village in Savoy, situated on the Guier, 12 miles southwest of Chambéry. The valley beyond this village, on the road to Chambéry, is blocked up by a huge limestone rock 800 feet high, over which travelers formerly used to climb by means of ladders—hence the name of the village. Through this mass of limestone a tunnel now extends, which is 25 feet high, 25 feet wide, and 1,000 feet long. The tunnel was projected and commenced by Napoleon I, and finished in 1817 by the king of Sardinia.

ESCHOLTZ BAY, a portion of the Arctic Ocean in Alaska, forming the innermost part of Kotzebue Sound, the first great inlet to the northeast of Bering Strait. It is about long. 161° W., being barely on the outside of the Polar Circle. It is worthy of notice on account of its fossil remains, which, though common on the northern coast of Siberia, are rare on that of the new continent.

ESCOBEDO, MARIANO, Mexican soldier, born in Dos Arroyos, Mexico, in January, 1828. During the war with the United States he armed his subordinates, and attacked small bodies of the invaders; later he fought with the Mexican army at Palo Alto and Resaca de Guerrero. In 1861 Escobedo attained the rank of brigadier-general. In 1862, during the French interference in Mexican affairs, he fought at Puebla and at the hill of Cerro del Borrego. Later he took part in the defense of Puebla against the French forces. In June, 1864, when the empire under Maximilian was established, Escobedo made a short resistance to the new order of things. In November, 1865, he surprised the garrison of Monterey. In June, 1866, the forces of Escobedo captured Saltillo, and in July Juarez established his government in that city. In December, 1866, Escobedo marched on San Luis Potosi, with an army of 15,000 men. On Feb. 1, 1867, he attacked the imperial general, Miramon, and destroyed half his army. At Queretaro the emperor Maximilian, with his two generals, Mejia and Castillo, became prisoners. A court-martial was held, by order of Juarez, and the emperor promptly condemned and shot. In 1875 Escobedo was commander-in-chief of the frontier department of the east, and in 1876 he served as secretary of war. In that year he went to New York city, and later proceeded to San Antonio, Tex., to renew Mexican agitation on his own behalf. From there he ventured to enter Mexico, where he was arrested, and sent as a prisoner to the capital. Here he was tried by court-martial, and narrowly escaped being declared guilty of conspiracy against the government. In 1879 he again went to New York city, on "private business," but in August, 1880, returned to Mexico. From 1882 until 1883 he was president of the supreme military court of justice.

ESMARCH, JOHANNES FRIDRICH AUGUST, a German surgeon, born at Tönning, in Schleswig-Holstein, Jan. 9, 1823. He was educated in the gymnasia at Rendsburg and Flensburg, and studied medicine at Kiel and Göttingen. During the Danish war of 1848 he served as assistant surgeon, later as adjutant of Stromeyer, and in 1850 was promoted to be chief surgeon. He was appointed professor and director of the hospital at Kiel in 1857; became a member of the hospital commission at Berlin in 1866, and during the Franco-German war of 1870 was surgeon-general and consulting surgeon of the army. The latter position he resigned in 1871, and since his return to Kiel he has been constantly engaged in his work as professor and surgeon. He is known to the medical profession throughout the world by his great invention in surgery, the bloodless method of operating on the extremities.

ESPARTERO, BALDOMERO (1793-1879), a Spanish soldier. He entered the army in 1809. In 1816 he was ordered to Peru, and promoted captain. He served with marked bravery in numerous important battles, and in 1825 was appointed chief of the general staff of the Army of Peru. In 1833 he became commander-in-chief of the province of Biscay, and later lieutenant-general. Subsequently he was appointed general-in-chief of the Army of the North, viceroy of Navarre, and captain-general of the Basque Provinces, and in 1839 was created a grandee of the first class, with the title of Duke of Victoria and Morella. In 1840 he was placed at the head of the ministry, and the following year was appointed regent by the Cortes. He retired to England in 1843, but in 1854 returned to Spain and was placed at the head of the ministry. He resigned, however, in 1856. In 1870 he was offered the crown of Spain by several members of the Cortes, but declined it on the ground of great age.

ESPLANADE, the open space intentionally left between the houses of a city and the glacis of its citadel. It requires to be at least 800 paces broad, that the enemy, in case of getting possession of the town, may not be able to assail the citadel under cover of the nearest houses. In old works on fortification the term is often applied to the glacis of the counter-scarp, or the slope of the parapet of the covered way towards the country.

ESPRINGAL, or SPRINGAL, in the military engineering of the days before the introduction of gunpowder into European warfare, was a machine for throwing missiles. These missiles were either large darts called *muchettes*, or arrows winged with brass and called *viretons*, from their whirling motion when shot forth.

ESPRIT DIVA, an aromatic liquor made in Switzerland, from a plant called *Genipi*. Like the *Swiss tea*, made from the same plant, it possesses sudorific properties.

ESPY, JAMES POLLARD (1785-1860), an American meteorologist. In 1808 he became principal of the classical Academy in Cumberland, and later was admitted to the Ohio bar. In 1817 he became a professor in the classical department of the Franklin Institute, Philadelphia. Later he advanced the theory that every great atmospheric disturbance begins with the uprising of air that has been rarefied by heat. In 1840 he visited Europe and presented his views to foreign scientists for examination. They reported favorably on them, but subsequent researches have led to important modifications of his views. In 1843 he received an appointment under the war department, and instituted a service of daily bulletins on the condition of the weather in different localities, which has since developed into an important branch of the war department. He published several volumes of weather reports, besides *Philosophy of Storms*.

ESSAYS AND REVIEWS, the title of a remarkable volume published in 1860, containing the following seven papers: (1) *The Education of the World*, by Dr. Temple; (2) *Bunsen's Biblical Researches*, by Dr. Rowland Williams; (3) *On the Study of the Evidences of Christianity*, by Professor Baden Powell; (4) *The National Church*, by H. B. Wilson; (5) *The Mosaic Cosmogony*, by C. W. Goodwin; (6) *Tendencies of Religious Thought in England, 1688-1760*, by Mark Pattison; (7) *The Interpretation of Scripture*, by Professor B. Jowett. All the writers, except Mr. Goodwin, were clergymen of the Church of England; and their work, which was censured for its heterodox views by nearly all the bishops, and formally condemned by convocation in 1864, caused much excitement and controversy. Dr. Williams and Mr. Wilson were sentenced by the ecclesiastical courts to suspension for a year, but on appeal the sentence was reversed by the Privy Council; and Dr. Temple's election to the see of Exeter in 1869 was also ineffectually opposed.

ESSENCE DE PETIT GRAIN is obtained by distillation from small unripe oranges, about the size of a cherry, and is used as a perfume in the same manner as *orange-flower water*.

ESSEX, a manufacturing town of Middlesex county, Conn., on the Connecticut River. It produces soap and carriages. Pop., 2,035.

ESTHERVILLE, the county-seat of Emmett county, Iowa, situated on the east branch of the Des Moines River. It has excellent educational advantages, grist and saw mills, and a machine shop. The business of the locality is farming and stock raising. Pop., 1,475.

ESTOILE, or SRAR, in heraldry, differs from the mullet by having six waved points; the mullet consisting of five plain points.

ESTRAY: in law, a horse, sheep or other domestic animal found wandering, and the owner of which is supposed to be unknown. By the common law of England estrays belonged to the sovereign. By statute law an estray becomes the property of the person in whose inclosure it is found, if not claimed by the owner within a year and a day. In the United States the law of estrays varies in the different States.

ESTREAT: in English law, a true extract copy, or note of some original writing or record, and specially of fines or amercements, as entered in the rolls of a court, to be levied by bailiffs or other officers.

ESTRÉES, GABRIELLE DE (c. 1571–99), mistress of Henry IV of France, with whom she became acquainted in 1590. She was married to a gentleman of Picardy, named Liancourt, from whom she soon separated. The king was so fond of her that, in spite of the opposition of Sully, he was about to divorce his consort, Marguerite de Valois, that he might marry Mme. de Liancourt, when the latter suddenly died at Paris, April 10, 1599.

ÉTANG DE BERRE, a salt lake of France, in the south of the department of Bouches-du-Rhône, communicating with the sea by a narrow channel, called Port-de-Bouc. It is 11 miles long by 9 broad at its widest part. This lake contains great quantities of eels and other fish. Salt works are in operation on its banks.

ÉTEX, ANTOINE, a French artist, born at Paris, March 20, 1808. He early devoted himself to art, receiving instruction from Ingres and Duban, and in 1828 he secured the second *prix de Rome* by his *Hyacinthus Slain by Apollo*. His statue of Cain, exhibited at the salon of 1833, secured him a commission for two groups for the Arc de l'Étoile, and in 1841 his *Tomb of Géricault* won the decoration of the Legion of Honor. Among his statues are *Hero and Leander*, at the museum of Caen; *Blanche of Castile*, at Versailles; *Charlemagne*, at Luxembourg; *Shipwrecked*, exhibited at the exposition of 1867; *Susanna Surprised at the Bath*. Among his paintings are: *Romeo and Juliet*; *Dante and Beatrice*; *The Great Men of the United States* (now in City Hall, New York); *The Flight to Egypt*. He executed designs for monuments and public works, and engraved a series of designs from the Greek tragic poets. He died in 1888.

ETHELREDA, St., a daughter of the king of the East Angles, canonized in the 7th century for her saintly virtues. Her festival in the calendar is October 17. Her name was popularly abbreviated or corrupted into St. Audrey.

ETHIOPS, or ETHIOPS, a term applied by the ancient chemists to certain oxides and sulphides of the metals which possessed a dull, dingy, or black appearance.

ETHMOID BONE, one of the eight bones which collectively form the cavity of the cranium. It is of a somewhat cubical form, and is situated between the two orbits of the eye, at the root of the nose. Its upper surface is perforated by a number of small openings (whence its name), through which the filaments of the olfactory nerve pass downwards from the interior of the skull to the seat of the sense of smell, in the upper part of the nose. It consists of a perpendicular central plate or lamella, which articulates with the vomer and with the central fibro-cartilage, and thus assists in forming the septum or partition between the two nostrils.

ETHYLAMINE, a substance strongly resembling ordinary ammonia and hartshorn in odor and other properties. It is found in coal tar, in the oil obtained during the destructive distillation of

bones, in the gases evolved during putrefaction, and may be produced by certain complicated chemical processes. Ethylamine is a mobile liquid of specific gravity 696 (water=1000), and boils at 66° F. It has an alkaline action with coloring matters, forms white fumes with strong acids, and in composition is analogous to gaseous ammonia (NH₃ or N H H H), with one of the atoms of hydrogen replaced by ethyl (C₂H₅ or A₂), and is represented

by the symbol C₂H₇, N or N $\begin{pmatrix} \text{H} \\ \text{H} \\ \text{C}_2\text{H}_5 \end{pmatrix}$.

ETIQUETTE: originally, a little piece of paper affixed to a bag or other object to signify its contents. The word came probably to possess the secondary meaning which we now attach to it, of the forms observed in the intercourse of life, more particularly on state occasions, from its having been customary to deliver such tickets, instructing each person who was to take part in the ceremony as to the part which he was expected to play. Cards which are still delivered to mourners at funerals, and those on which the order of the dances is set forth at balls, are of this nature.

ETIVE, a sea-loch in the north of Argyleshire, running inland from the Firth of Lorn, 20 miles east and northeast, with a width of from a quarter of a mile to three miles. It is bordered by granite in its upper part, and by trap in its lower. Near its mouth there is mica-slate on the north side, and Permian strata on the south. The loch abounds in seals, salmon, porpoises, and cod. At the south side of the mouth of Loch Etive, on a projecting conglomerate rock 10 to 30 feet high, are the ruins of Dunstaffnage Castle, the ancient stronghold of the MacDougals, a building in the Edwardian style, with walls 400 feet in circumference, 30 to 50 feet high, and 10 feet thick, and with three round towers.

EU, COMTE D', PRINCE LOUIS PHILIPPE MARIE FERDINAND GASTON D'ORLÉANS, was born at the château de Neuilly, in the department of the Seine, April 28, 1842, is the eldest son of the Duc de Nemours, and one of the grandsons of King Louis Philippe. Brought up in exile, he was educated in England, and entered the military service of Spain in 1859, serving in Morocco. Later he joined the artillery college at Segovia, from which he graduated in 1863. In 1864 he married Isabella, the eldest daughter of Dom Pedro II of Brazil. He was made a field marshal in the Brazilian army in 1865, and in 1869 was appointed commander-in-chief of all the forces on land and sea, a position he retained until the war with Paraguay (begun in 1864) was ended in 1870 by the death of Lopez, dictator of Paraguay. From 1865 to 1889 he held the post of commander-general of the Brazilian artillery, and was president of various commissions. In the many absences of Dom Pedro from the empire during this period, the Comte d'Eu had the virtual direction of all Brazilian affairs. When the revolution of November, 1889, occurred, establishing the Republic of Brazil and deposing the emperor, the Comte d'Eu, with his wife, accompanied Dom Pedro to Portugal, and he has since resided in Europe.

EUFAULA, a city of Barbour county, Ala., on the Chattahoochee River. It is a winter health resort, has a female college, water-works, bagging factory, fair ground, and is a great cotton-shipping point, with a population in 1890 of 4,394.

EUGANEAN HILLS, a range of well-wooded hills, with a north and south axis, lying southwest of Padua in Northern Italy. They owe their origin to eruptions of trachyte during the Jurassic period. The highest point, Monte Venda, reaches 1,749 feet.

EUGENE CITY, the county-seat of Lane county, Oregon, 71 miles south of Salem, on the west bank of the Willamette River. It is a business and educational center, and contains the University of Oregon. Population (1890), 4,000.

EUGENIA, a genus of plants of the natural order *Myrtaceæ*, nearly allied to *Myrtus*, and differing only in having a 4-parted instead of a 5-cleft calyx, four instead of five petals, and one or two-celled berry, with one seed in each cell. The species are trees and shrubs, natives chiefly of tropical and sub-tropical countries.

EUGÉNIE-MARIE DE MONTIJO, empress of the French and wife of Napoleon III, born at Granada, in Spain, May 5, 1826. She is descended on the father's side from an old and noble Spanish family, and by her mother is connected with an ancient Scottish family, the Kirkpatricks of Closeburn. She was educated principally at Madrid, and spent a great portion of her youth in traveling with her mother. In 1851 she appeared in Paris, where her beauty and graceful demeanor won the admiration of the emperor of the French. The wedding was celebrated Jan. 30, 1853, at the church of Notre Dame. One son, the fruit of this union, was born March 16, 1856. On the deposition of the emperor in September, 1870, and the declaration of a republic, Eugénie fled almost alone from France, and took refuge in England, where she was joined by the prince imperial, and in the following March by her husband. The ex-emperor died in 1873, and the prince was killed in the Zulu war, June 1, 1879. His body was brought to England and buried at Chiselmhurst, and the following year the empress went to Zululand to visit the fatal spot on the anniversary of her son's death. At the beginning of the year 1881 the empress removed from Camden House to the Farnborough estate in Hampshire, close to the borders of the county of Surrey. The estate consists of about 257 acres, with a pretentious mansion.

EUOMPHALUS, a large genus of fossil gasteropodous shells, characterized by its depressed and discoidal shell, with angled or coronated whorls, five-sided mouth, and very large umbilicus. The operculum was shelly, round, and multi-spiral. The genus seems related to *Trochus*. It appears among the earliest tenants of the globe, and keeps its place till the Triassic period. Eighty species have been described.

EUONYMIN, an extract from the bark of the *Euonymus atropurpureus*, the Spindle Tree, or Wahoo, a shrub indigenous to the United States. It is used in America as a tonic and diuretic, and in Britain for its stimulant action on the liver.

EUPATORIUM, a genus of plants of the natural order *Compositæ*, sub-order *Corymbifera*, having small flowers (heads of flowers) in corymbs, florets all tubular and hermaphrodite, club-shaped stigmas imbricated bracts, a naked receptacle, and a hairy pappus. The species are numerous and mostly American. Thorough-wort (*E. perfoliatum*), a species having the opposite leaves joined at the base, is used as a medicine.

EUPHEMISM, a figure of rhetoric by which an unpleasant or offensive matter is designated in indirect and milder terms.

EUPHON, or **EUPHONON**, a musical instrument invented by Chladni in 1790. It is similar in tone to the harmonica, and, like it, the tone is produced from the sounding body by the finger direct, without mechanism, and is regulated in quality and effect by the taste and feelings of the performer.

EUPHONIUM, a bass Saxhorn. The *Euphonon*, a variation of the harmonica, was invented by Chladni in 1790.

EUPHORBIA. See *Britannica*, Vol. VIII, p. 668. **EUPHORBIA**, OIL OF, or OIL OF CAPER SPURGE, an extremely acrid fixed oil, obtained by expression, or by the aid of alcohol or ether from the seeds of the caper spurge. This oil much resembles croton oil, for which it is sometimes used as a substitute.

EUPHORBIACEÆ, a very extensive order of dicotyledons, containing upwards of 3,500 known species—trees, shrubs and herbaceous plants—of the most extraordinarily varied, often even cactus-like, habit. They abound in warm countries, and most in tropical America. The few species found in the colder parts of the world are all herbaceous. The *Euphorbiaceæ* usually abound in an acrid and poisonous milky juice; although there are species whose juice is bland, or becomes so through the application of heat. Many of them are valued for their medicinal properties.

EUPHROSINE, one of the Graces.

EUPODA, a family of coleopterous insects of the tetramerous section of the order, deriving their name (well-footed) from the great size of the hinder thighs of many of the species. The body is oblong, the antennæ filiform. Some of them are among the most beautiful of tropical insects.

EURASIANS, a name applied to the offspring of European parents on the one side and Asiatics on the other side, and chiefly used in India of the children whose fathers are Europeans and whose mothers are Hindoos, and their descendants. The term Eurasian is also used in geography for facts true of Europe and Asia (Eurasia) taken as one continent.

EUREKA, a city and county-seat of Humboldt county, Cal., on Humboldt bay, seven miles from the ocean. It has a good harbor and is a shipping-point for redwood lumber. Population, 4,858.

EUREKA, a village in Olio township, Woodford county, Ill., 19 miles east of Peoria. It contains Eureka College, with which is connected a normal school and a Biblical school under the direction of the Disciples of Christ. Population, 1,481.

EUREKA, a city and county-seat of Greenwood county, Kan. Population (1890), 2,259.

EUREKA, the county-seat of Eureka county, Nev., midway between Salt Lake and San Francisco. Mining is the chief business, and large quantities of lead and silver ore are produced. This place is third in importance in the State. Pop., 1,609.

EUREKA SPRINGS, a city and county-seat of Carroll county, Ark., situated in the White River Mountains. Its medicinal springs attract thousands of health-seekers. Population, 3,706.

EUSTIS, JAMES B., an American soldier and statesman, was born in New Orleans in 1834. He was given a classical education and graduated at Harvard Law School in 1854. He practiced law in New Orleans, and at the outbreak of the war he served on the staff of the Confederate General Magruder, being subsequently transferred to the staff of General Joe Johnston, with whom he served to the close of the war. He was elected a member of the State Legislature before the Reconstruction acts, and was one of the committee sent to confer with President Johnson upon Louisiana affairs. In 1872 he was elected a member of the State Assembly, and in 1874 was put into the State Senate for a term of four years, but was called to serve in the United States Senate from 1877 to 1879. After that he became professor of civil law in the University of Louisiana, and held that position when he was again elected Senator by the Democrats in 1884. His term expired in March, 1891. In 1893 he was appointed by President Cleveland as minister to France.

EUTERPE, a genus of palms, having male and female flowers intermingled on the same spadix; the spadices springing from beneath the leaves; the spathe entire, membranaceous and deciduous. They are very elegant, with lofty, slender, smooth faintly fringed stems and pinnate leaves, forming a graceful feathery plume; the base of the leaf-stalk sheathing far down the stem, and so forming a thick column of several feet in length at its summit.

EUTHANASIA, an easy death, or a painless method of putting to death.

EVANSTON, formerly a post-village of Illinois, but now a populous suburb of Chicago, ornamented with many superb residences and substantial public buildings. It is situated 12 miles north of the city hall. It possesses a ladies' college and the Garrett Biblical Institute, and is the seat of the Methodist Northwestern University. Evanston stands in about the same relation to Chicago that Brooklyn does to New York. While not politically annexed, the majority of her citizens pursue their business avocations in Chicago, and her absorption by the western metropolis is simply a question of time. Its population in 1890 was 14,000. Evanston has now a city charter.

EVANS, FREDERICK WILLIAM, an American reformer, born in 1808. In 1880 he joined the Shakers at Mt. Lebanon, N. Y.; was appointed assistant elder in the "North Family" in 1838, and twenty years later became elder of the three "families." Besides contributing to seventy different publications, he is the author of several works concerning his sect.

EVANSTON, the county-seat of Uintah county, Wyo., on the Bear River, midway between Omaha and San Francisco. Coal and iron are found in the vicinity. The town has railroad machine shops, employing a large number of men.

EVANSVILLE, a city of Indiana, and county-seat of Vanderburg county (see Britannica, Vol. VII, p. 727). Evansville has 10 lines of railway, and 8 steamboat lines. The city is built over two veins of soft coal, and within a radius of 30 miles 60 coal shafts are in operation. The public school system is excellent. There are 12 public school buildings, valued at \$423,207. High schools are provided for both colored and whites, the races being taught separately. There is a fine public library and art gallery. There were, in 1891, 260 manufacturing establishments. The hard wood lumber trade is enormous, said to be the largest in the country. The production of flour reaches 630,000 barrels annually, and 15,000,000 brick are yearly manufactured within the city limits. Evansville has grown rapidly during the last decade. Population in 1880, 29,280; in 1890, 50,674.

EVANSVILLE, a village of Rock county, Wis. It contains a seminary, a steam cabinet-manufacture, and a machine shop. Population, 1,523.

EVART, a lumbering town of Osceola county, Mich., containing saw and shingle-mills, a machine shop, and a foundry. Population, 1,269.

EVARTS, JEREMIAH (1781-1881), an American philanthropist. From 1806 to 1810 he practiced law in New Haven, Conn.; was editor of the "Panoplist" from 1810 to 1820, when he was made editor of the "Missionary Herald"; in 1812 became treasurer of the American board of commissions for foreign missions. In 1821 he was chosen corresponding secretary of the board, and retained the position until his death. He published several essays and speeches.

EVARTS, WILLIAM MAXWELL, a United States ex-Senator, born in 1818. He studied in the Harvard Law School, and was admitted to the bar in

New York in 1841; was chairman of the New York delegation in the National Republican convention of 1860; was Attorney-General of the United States from July 15, 1868, to March 3, 1869; received the degree of LL.D. from Union College in 1867, from Yale in 1865, and from Harvard in 1870; was counsel for President Johnson on his trial upon his impeachment in 1868; was counsel for the United States before the tribunal of arbitration on the Alabama claims at Geneva, Switzerland, in 1872; was counsel for President Hayes, in behalf of the Republican party, before the Electoral Commission; was Secretary of State of the United States from 1877 to 1881; was elected to the United States Senate as a Republican from New York, in the place of Elbridge G. Lapham, Republican, and took his seat March 4, 1885. His term of service expired March 3, 1891.

EVE, PAUL FITZSIMONS (1806-77), an American physician. He graduated at the medical department of the University of Pennsylvania in 1828; studied in London and Paris; served as an ambulance surgeon during the revolution of 1830, and as a regimental surgeon in the Polish war. In 1831 he returned to the United States, and in 1832 became professor of surgery in the Medical College of Georgia. In 1849 he was elected surgical professor in the University of Louisville; in 1850 in the University of Nashville; in 1868 in the University of Missouri, and later returned to Nashville as professor of operative and clinical surgery. In 1877 he became professor of the principles of surgery in the Medical College at Nashville. During the civil war he served with the Confederate army in Mississippi and Georgia. He published several works on surgery, besides contributing extensively to various medical journals.

EVERETT, a city of Massachusetts, located in Middlesex county, in the extreme eastern portion of the State. It adjoins Boston, with which it is connected by the Eastern Railroad. It is supplied with water from the Mystic Water-works of Boston. Prior to 1870 it formed a part of Malden. It has an excellent system of public schools. Population in 1880, 4,159; in 1890, 11,068.

EVERETT, a borough of Bedford county, Pa., 9 miles east of Bedford.

EVERETT, ROBERT W., a farmer, born near Hayneville, Ga., March 3, 1839. He was educated at Mercer University, Ga., graduating in 1859, and becoming a teacher. He served in the Confederate army during the war of the Rebellion. In politics a Democrat, he served two years as commissioner of revenues, and twelve years as a member of the board of education, being its chairman four years. He was elected a member of the State House of Representatives in 1882, and served four years, being chairman of the committee on agriculture in 1884 and 1885. In 1890 he was elected a Representative from the Seventh Congressional District of Georgia to the 52d Congress.

EVERGREENS. See Britannica, Vol. II, p. 319.

EVERSLEY, a village of northeast Hampshire, England, 13 miles northeast of Basingstoke. Charles Kingsley was rector of the parish from 1842 until his death in January, 1875, and is buried in the churchyard.

EVICION. See Britannica, Vol. XIV, p. 275; Vol. XX, p. 403.

EWBANK, THOMAS (1792-1870), an American scientist. From 1819 to 1836 he was employed in New York, first as a machinist, and then in the manufacture of metallic tubing. He retired in 1836 to devote himself to literature and scientific pursuits. From 1849 to 1852 he was United States Commis-

sioner of Patents. He published, among other works, many books on scientific subjects.

EWELL, RICHARD STODDERT (1817-72), an American soldier. He served in the Mexican war, and against the Apaches in New Mexico in 1857. At the beginning of the civil war he entered the Confederate army, and was actively engaged throughout the war. He several times won distinction and attained the rank of lieutenant-general. After the war he retired to private life.

EWER, FERDINAND CARTWRIGHT (1826-83), an American clergyman. In 1857 he was ordained deacon in the Protestant Episcopal church, and a year later became priest. He labored two years in Grace church, San Francisco, and then returned to the East, where he was appointed assistant minister in St. Ann's church, New York city. From 1862 to 1871 he was rector of Christ church, and then for a time of St. Ignatius. In 1883, while preaching in St. John's church, Montreal, he was stricken with paralysis, and died three days later. He was the author of several works on theology.

EWING, a village of Franklin county, Ill. It is the seat of Ewing College, and contains a large woolen factory.

EWING, JULIANA HORATIA ORR, writer for children, born at Ecclesfield, Yorkshire, in 1842, died at Bath, May 13, 1885. She early began to compose nursery plays for her brothers and sisters, which they performed, her brother, Alfred Scott Gatty, acting as musical director. Mrs. Ewing was a graceful writer, and her studies of children and child-life were simple and natural. In 1867 she married Major Alexander Ewing.

EWING, THOMAS (1789-1871), an American statesman. From 1816 to 1831 he practiced law in Lancaster, Ohio, and from 1831 to 1837 served as United States Senator. In 1841 he became Secretary of the Treasury, and in 1849 Secretary of the Interior. In 1850 he was appointed United States Senator, but resigned the following year and resumed his law practice in Lancaster. In 1829 Mr. Ewing adopted William T. Sherman, then a boy of nine, into his family.

EXCALIBUR, the famous mystic sword of King Arthur, which was given him, as Merlin promised, by the Lady of the Lake, and at his death was flung into the river and caught up by a hand which rose above the waters.

EXCEMENTOSIS, a new word now used in dental literature as a substitute for *exostosis*, in describing a morbid, bony growth on the surface of the teeth. See DENTISTRY, in these Revisions and Additions.

EXCIPIENT, an inert or slightly active substance, introduced into a medical prescription as a *vehicle*, or medium of administration for the strictly medicinal ingredients.

EXCITANTS, or STIMULANTS, those pharmaceutical preparations which, acting through the nervous system, tend to increase the action of the heart and other organs. They all possess an acrid and pungent taste, and give a sensation of warmth when placed on a tender part of the skin.

EXCLUSION BILL, a proposed measure for excluding the Duke of York, afterwards James II, from succession to the throne, on account of his avowed Roman Catholicism. A bill to this effect passed the Commons in 1679, but was thrown out by the Upper House (see Britannica, Vol. VIII, p. 350). As the new Parliament summoned in 1681 seemed determined to revert to this measure, it was dissolved, and Charles ruled henceforth without control.

EXCULPATION, LETTERS OF: in the law of Scotland, the warrants granted to the accused party, or

panel as he is called, in a criminal prosecution, to enable him to cite and compel the attendance of such witnesses as he may judge necessary for his defense.

EXECUTION: in criminal law, the infliction on criminals of the punishment of death in conformity with legal decree.

EXECUTION: in law, the act of completion or carrying into effect. Thus a writ is executed by obeying the instructions contained in it; a deed when it is signed, sealed, and delivered; a power when it is exercised; a judgment of a court when it is enforced.

EXECUTORY: in English law, a term applied to contracts, etc., which are not executed—that is, not completed with the forms required to make them legally operative. In American law, the term executory is used as in England.

EXERCISE, a very important element of medical regimen, both in the preservation of health and in the cure of disease.

EXETER, one of the county-seats of Rockingham county, N. H., on the Squamscott River, 50 miles north of Boston. The well-known Phillips Academy is here, also Robinson Female Seminary. It has a cotton mill, railroad round-house, and manufactures castings, Population, 4,284.

EXETER HALL, a large proprietary building, on the north side of the Strand, London. It was completed in 1831, and can contain upwards of 5,000 persons. It is let chiefly for religious assemblies, and is in great demand during the "May Meetings" of the several religious societies. It has also been used for musical fêtes. In 1880 it was purchased for £25,000 for the Young Men's Christian Association.

EXHAUSTIONS, METHOD OF, a mode of proving mathematical propositions regarding quantities by continually taking away parts of them. The method was frequently employed by the ancient geometers; its fundamental maxim, as stated by Euclid, being that those quantities are equal whose difference is less than any assignable quantity.

EXMOOR FOREST, a moory, mostly uncultivated waste, consisting of dark ranges of hills and lonely valleys, 14 square miles in area, in the west of Somersetshire and northeast of Devonshire, England. It is bordered by deep-wooded glens. The hills rise in Dunkery Beacon to 1,668 feet, in Chapman Barrow to 1,540, and in Span Head to 1,510. Devonian slates, with some New Red Sandstone in the north, form the substratum. It is covered with heath, juniper, cranberry, and whortleberry, and has some meadow-land. Throughout this tract there is a native breed of ponies, known as Exmoor ponies, reputed stout and hardy. Iron is mined here.

EXOGENOUS PLANTS, or EXOGENS, a term applied to dicotyledons by Lindley to express an erroneous view of the difference in the mode of stem-thickening from that of monocotyledons, and now wholly disused by botanists.

EXOSTEMMA, a genus of American trees and shrubs of the natural order *Cinchonaceæ*, nearly allied to *Cinchona*. Several species yield febrifugal barks, which, however, do not contain the cinchona alkaloids. The most valued are Caribbee Bark and Saint Lucia Bark.

EXOTIC PLANTS, or EXOTICS, cultivated plants originally derived from foreign countries. The term is generally applied to those whose native country differs so much in soil or climate from that into which they have been conveyed that their cultivation is attended with difficulty, requiring artificial heat or other means unlike those requisite in the case of indigenous plants.

EXPECTATION WEEK, the name given to the period elapsing between Ascension Day and Whitsunday, because during this time the Apostles continued praying in earnest expectation of the Comforter.

EXPECTORANTS, medicines given to carry off the secretions of the air-tubes.

EXPECTORATION, the mucus or other secretion discharged from the air-passages.

EXPERIMENT, the means by which we extend and confirm our knowledge of Nature. An experiment is properly a proceeding by which the inquirer interferes with the usual course of a phenomenon, and makes the powers of Nature act under conditions that, without his interference, would never, perhaps, have presented themselves all together.

EXPERT, a person of special practical experience or education in regard to a particular subject—a word commonly applied to medical or scientific witnesses in a court of justice, when selected on account of special qualifications, as in the case of an analysis of the contents of the stomach in suspected poisoning. It is also applied to one professionally skilled in handwriting, for detecting forgery of deeds and signatures.

EXPLOSIVES, substances by whose decomposition or combustion gas is generated with such rapidity that they can be used for blasting or in fire-arms (see *Britannica*, Vol. VIII, pp. 806-813). They may be classed generally as follows:

Gunpowder.	Nitro compounds.
Gun-cotton.	Picric acid.
Fulminates.	

The nitro-compounds are nitro-cellulose, nitro-glucose, nitro-starch, and nitro-glycerine and its compounds. The fulminates are fulminating mercury, fulminating silver, chlorate of potassium and sulphide of antimony, sulphur and chlorate of potassium, and red phosphorus and chloride of potassium. The mixture of nitro-glycerine with dry pulverized absorbent substances has given rise to a variety of explosives, of which the name dynamite is perhaps generic. Among these mixtures are:

Dualin.	Jupiter powder.
Giant powder.	Lignose.
Hercules powder.	Mica powder.
Neptune powder.	Titanite.
Potential powder.	Titan powder.
Rendrock.	Vigorite.
Sebastine.	Vulcan powder.
Thunderbolt powder.	

The relative efficiency of the various modern explosives is shown by the following table, which is the result of two years' trial by the United States Board of Army Engineers. Ordinary dynamite is taken as the standard:

Dualin.	111.
Hercules powder No. 1.	106.
Dynamite, No. 1.	100.
Rendrock.	94.
Gun-cotton.	87.
Dynamite, No. 2.	83.
Hercules powder, No. 2.	88.
Mica powder.	83.
Vulcan powder.	82.
Nitro-glycerine.	81.
Blasting gunpowder, No. 1.	30.

For a description of the various explosives, see their respective headings.

EXPONENT AND EXPONENTIAL. When wanting to express the multiplication of unity for any number of successive times by the same number or quantity, *e. g.*, $1x5x5$, or $1xaxaxa$, it was found more convenient to write $1x5^2$ or simply, 5^2 and a^2 , and the numbers, 2 and 3, indicating how often the

operation of multiplication is repeated, were called exponents. But the theory of exponents gradually received extensions not originally contemplated, and has now an extensive notation of its own. Thus $a^0=1$, $a^1=a$, $a^2=1+a^2$, $a^{\frac{1}{2}}=\sqrt{a}$, $a^{\frac{1}{3}}=\sqrt[3]{a}$, $a^{\frac{2}{3}}=\sqrt[3]{a^2}$, or the cube root of the square of a . Also A^x is the X th power of A , X being any number integral or fractional; and, A continuing the same, X may be so chosen that A^x shall be equal to any given number. In this case, X is called the logarithm of the number represented by A^x . Considered by itself, A^x is an exponential. Generally, any quantity representing a power whose exponent is variable, is an exponential, as A^x , H^x , Y^x , etc. Exponential equations are those which involve exponentials, such as $A^x=b$, $H^x=c$.

EX POST FACTO LAW, any criminal or penal statute rendering an act punishable in a manner in which it was not punishable when it was committed. Any law which would make an act criminal which was not criminal when done, or which would increase the severity of the punishment of a previous act, or which would alter the rules of evidence or procedure so as to put one accused of a crime committed previous to the law in a worse position before the courts, is prohibited by the Constitution of the United States.

EXPRESS, a system in vogue in the United States for the transportation of articles of moderate weight and bulk from one point to another. It was originated by William Frederick Harnden in 1839, and has been since greatly extended. The bulk of the business is now done by express companies, who, upon the acceptance of a parcel, guarantee its safe delivery and become responsible as common carriers. A peculiar feature of the business is the delivery of articles purchased at a distance and the collection from the purchaser of the price agreed on, known as the "collect on delivery" system. All the express companies issue money orders on payment of a small fee.

EXTENSION: in logic, a word put into contrast with another term, **COMPREHENSION**, and the two mutually explain each other. A general notion is said to be extensive according to the extent of its application, or the number of objects included under it.

EXTENT: in English law, a writ issuing out of the court of exchequer to compel payment of debts to the crown.

EXTENUATING CIRCUMSTANCES, those circumstances, in connection either with the position of the prisoner or with the act alone which are taken into consideration by the court in mitigation of the punishment. The previous good character of the person convicted may always be proved as a circumstance giving him some claim to leniency of punishment. Besides character, there are other circumstances which sometimes serve to mitigate the sentence, sometimes to take the act done out of the category of crime altogether. One is youth. Thus, no act done by any person under seven years of age is a crime. Defective mental power in the person convicted will always be considered in determining the severity of his sentence. Disease of mind, such as prevents a man from knowing that the act he does is wrong, will excuse him from consequences of an act otherwise criminal.

EXTORTION: in law, the offense or illegal act committed by a public officer who, under color of his office, takes from any person any money or valuable thing, which is not due from him at the time when it is taken. The act is a misdemeanor, and punishable as such.

EXTRACT OF MEAT is obtained by acting upon chopped meat by cold water, and gradually heating,

when about one-eighth of the weight of the meat is extracted, leaving an almost tasteless insoluble fibrine.

EXTRACTIVE MATTER, the term applied to certain organic matters resembling humine, which are found in soils during the decay of vegetable matter, and are precipitated during the concentration of water solutions.

EXTRACTS: in a technical sense, medicinal preparations of vegetable principles, obtained either by putting the plants in a solvent or menstruum, and then evaporating the liquid down to about the consistency of honey, or by expressing the juice of the plants and evaporating; this last is properly *inspissated juice*. Extracts, therefore, contain only those vegetable principles that are either held in solution in the juices of the plants themselves, or are soluble in the liquids employed in extracting them, and at the same time are not so volatile as to be lost during evaporation. As many extractive matters are more or less volatile it makes a great difference whether the operation is conducted at a low or a high temperature. Extracts are called *watery* or *alcoholic* according as the menstruum employed is water or spirits. Ether is sometimes used in extracting.

EXTRAVASATION, the escape of any of the fluids of the living body from their proper vessels through a rupture or injury in their walls. Excrementitious matter thus sometimes escapes into the abdomen through a wound or ulceration of the bowels. But the term is oftenest used in speaking of the escape of blood from injured blood-vessels. Extravasation is distinguished from exudation by this, that in the latter the vessels remain entire, and the effusion takes place by filtration through their walls; only a part of the blood escapes, the blood globules being retained, while in extravasation perfect blood is effused. Many kinds of extravasation are immediately fatal, such as that of urine or gall into the abdomen, or of blood from the vessels of the brain in many cases of apoplexy. The dark color resulting from a bruise is owing to extravasated blood from ruptured capillary vessels.

EXUMAS, a part of the group of the Bahama Islands, comprising Great Exuma, Little Exuma and the Exuma Keys. They contain about 2,000 inhabitants, who are employed partly in agriculture, but chiefly in salt making. In 1851, the Exumas exported 115,356 bushels of salt. Little Exuma is the second most important port of entry in the Bahamas.

EXUVIÆ, a term applied to organic remains, now seldom employed, but frequently used by the older geologists.

EYÄLET, next to a province, the largest and most important of the divisions of the Turkish Empire, which contains in all 36 eyalets. Each eyalet or general government is administered by a pasha, who is governor. The governors belong to the Dignities of the Sword, and are pashas of two tails; when they are raised to the rank of vizier, as is frequently the case, they become pashas of three tails.

EYAM, a village in North Derbyshire, England, five miles north of Bakewell, with a population of 1,038, chiefly engaged in lead mining. Here, in September, 1665, the plague, then raging in London, broke out in its most virulent form. William Monpesson, the rector of the parish, aided by Thomas Stanley, devoted himself to the care of the dying with the most heroic courage. The plague lingered 13 months and 260 out of a population of 350 perished.

EYE, JOHANN LUDOLF AUGUST VON, a German art historian, born at Fürstana, in Hanover, May 24, 1825, and educated at the gymnasium in Osnaburg, and at the University of Göttingen. In 1853 he was appointed director of the collection of art and antiquities in the museum at Nuremberg, in 1874 accepted a professorship in Rio Janeiro, Brazil, but the following year returned to take charge of the art museum in Dresden. In 1881 he returned to Brazil. He has published *Deutschland vor drei hundert Jahren in Leben und Kunst* (1857), *Eine Menschenseele, Spiegelbild aus dem 18 Jahrhundert* (1863), *Wesen und Werth des Daseins* (1870), and *Das Reich des Schönen* (1878).

EYEBRIGHT (*Euphrasia*), a genus of plants of the natural order *Scrophulariceæ*, having a tubular calyx, the upper lip of the corolla divided, the lower of three nearly equal lobes, the cells of the anthers spurred at the base, a two-celled capsule and striated seeds. Some of the species are root parasites. They are natives of Europe and Asia. The common eyebright (*E. officinalis*) is a little plant about six inches high, with ovate serrated leaves, and white or reddish flowers streaked with purple, appearing singly in the axils of the leaves. It is abundant in pastures and on mountains, and has been used as a medicine in diseases of the eyes, and catarrhal affections. It is a weak astringent.

EYÖT, a little island in a river, especially one overgrown with willows, as in the Thames.

EYRE, a salt lake of South Australia, lying north of Spencer Gulf, at an altitude of 79 feet, and having an area of 3,706 square miles. Except in the rainy season, this lake is generally a mere salt marsh. It was discovered in 1840 by Eyre.

EYRE, EDWARD JOHN, a British diplomatist, born in 1815. He served for sometime as governor of New Zealand, and in 1854 was appointed lieutenant-governor of the island of St. Vincent. In 1859-60 he acted as the administrator of the Leeward Islands. In 1862 he was appointed to administer the government of Jamaica and its dependencies, and in 1864 was appointed captain-general, governor and vice-admiral. He was afterwards recalled on charges of unnecessary severity in suppressing an insurrection; but the accusations were never substantiated. See *Britannica*, Vol. III, p. 105, and *JAMAICA*, Vol. XIII, p. 551.

EYRIA PENINSULA, on the south coast of South Australia, triangular in shape, its base being formed by the Gawler Range, while its sides are washed on the southeast by Spencer Gulf, and on the southwest by the Great Australian Bight. It is a rich pastoral country.

F

F—FACTORY LEGISLATION

F, in music, is the fourth note of the natural diatonic scale of C, and stands in proportion to C as 4 to 3, and is a perfect fourth above C as fundamental note. F major, as a key, has one flat at its signature: namely, B flat. F minor has four flats, the same as A flat major, of which it is the relative minor.

FAAM, or FAHAM, an orchid, native of Madagascar, prized for the fragrance of its leaves, which is owing to the presence of *Coumarin*. In Mauritius an infusion of faam leaves is in great repute as a cure for pulmonary consumption.

FABLIAUX, an appellation given in old French literature to a class of short metrical narratives, intended for recitation; the tales of the Trouvères.

FABRE, CHARLES EDWARD, born in Montreal, Canada, Feb. 23, 1827, was ordained priest in 1850; became bishop in 1873; was translated to Montreal in 1876, and on June 8, 1886, became the first Catholic archbishop of Montreal.

FABRE, LOUIS K. H., brother of the foregoing, born in Montreal Aug. 9, 1834, was called to the bar in 1856, and has long been connected with the newspaper press of Quebec. He entered the senate in 1875.

FABRONI, GIOVANNI, V. M. (1752–1822), director of the physical cabinet of the Grand Duke of Tuscany. He constructed many important military bridges, and in 1815 became professor of natural science at Pisa University.

FABVIER, CHARLES N. BARON (1782–1855), a French officer who became a peer of France in 1845, and a member of the legislative assembly in 1849. He served in Spain, Greece and France.

FAÇADE, the exterior front or face of a building. This term, although frequently restricted to classic architecture, may be applied to the front elevation of a building in any style. It is generally used with reference to buildings of some magnitude and pretensions; thus, we speak of the *front* of a house, and the *façade* of a palace. The sides of a court or cortile are also called *façades*.

FACET, a term employed to denote the plane surfaces of crystals, or those artificially cut upon precious stones.

FACIAL NEURALGIA, pain in parts of the head and face rendered sensible by connection with the trigeminus nerve. It is caused by a morbid state of the nerve-center or other pathological condition.

FACIAL PARALYSIS arises from a loss of the motor property of the nerve supplying the facial muscles, and results in a loss of expression on the affected side, and a drawing of the mouth and other features to the healthy one.

FAC-SIMILE, an exact copy, as of handwriting.

FACTOR: in mathematics, one of the quantities which, multiplied together, form the product. The numbers 6 and 4 multiplied together, make 24; hence 6 and 4 are called factors of the product 24. Most numbers are products of two or more factors: $12 = 3 \times 4$, or 2×6 , or $2 \times 2 \times 3$.

FACTORY, a term contracted from *manufactory*, applied to a building, or collection of buildings, appropriated to the making of goods on an extensive scale. In the United States the factory system has had a rapid growth. At the close of the Revolutionary war factories were practically un-

known in this country, while now the number of manufacturing establishments exceeds 300,000, and the value of the products is greater than that of any other country. For information concerning the number of factories of the various countries, hands employed, wages paid, value of products, etc., see MANUFACTURES, in these Additions and Revisions.

FACTORY LEGISLATION IN AMERICA. The British "Factory and Workshop act" has no counterpart in the United States. A few of the States have adopted laws regulating the age at which children can be employed in factories, and prescribing the number of hours constituting a day's work.

In New Hampshire, Vermont, Massachusetts and New Jersey, no child under ten years of age can be employed in any factory. In Rhode Island the minimum age is twelve, and in Pennsylvania, thirteen. The factory legislation of Connecticut forbids the employment of any child under 14 years of age, unless such child shall have attended school at least two months during the preceding year; and no child under 15 can be employed in any factory more than ten hours per day.

In Maine no child under 12 years of age can be employed in any cotton or wool factory without having attended a public or private school at least four months during the year preceding such employment. Between 12 and 15 years of age such child must have attended school at least three months during the previous year.

In Maryland, no children under 16 years of age may be employed in factories for more than ten hours per day.

Massachusetts has taken more advanced steps in factory laws, and provides inspectors for their enforcement. In this State no child under 14 may be employed, except during school vacations, unless he has for 20 weeks during the preceding year attended school. No minor under 18 years and no woman shall be employed more than 60 hours in a week.

In New Hampshire no child under 12 years of age shall be employed in any factory unless he has attended the school of his district the whole time it was in session. Between 12 and 14 such child must have attended school six months. Between 14 and 16 twelve weeks' school attendance is required. No child under 15 years of age can be employed more than 10 hours per day, except by the written consent of parent or guardian.

In New Jersey no minor may be required to work more than ten hours on any day.

The New York act provides that no children under 14 years of age shall be employed during school hours, unless they attended school 14 weeks of the preceding year.

In Ohio 14 is the age under which no child may be employed during school-hours unless he has attended school 12 weeks during the year preceding.

In Pennsylvania no child between the ages of 13 and 16 shall be employed more than nine months; three consecutive months being allotted to school attendance.

In Rhode Island no child between 12 and 15 years of age may be employed more than nine months

in any year; and then not unless he has devoted three months of the preceding year to schooling.

The factory act of Vermont provides that children between 10 and 15 years of age shall not be employed in factory or mill unless they have attended school at least three months during the preceding year, and are not to be employed more than ten hours per day.

FACULÆ, in astronomy, are spots brighter than the rest of the surface, which are sometimes seen on the sun's disc. They are assumed to be elevated portions of the photosphere.

FACULTY, a name applied to certain powers of the mind, chiefly of the intellect. In discussing the intellect, whatever are considered its fundamental functions are its faculties. According to the older metaphysicians, the leading intellectual faculties are perception, memory, reasoning and imagination; these, however, would not now be considered as giving the ultimate analysis of the intellect. Conscience, or the moral sense, has sometimes been called the *moral faculty*.

FAED, JOHN, a Scottish painter, born at Burley Mill, near Gatehouse-of-Fleet, Kirkcudbrightshire, in 1820. His love of art was early manifested, and when hardly in his teens he made tours through the villages of Galloway, painting miniatures. In 1841 he went to Edinburgh and in 1861 to London, where his talents won recognition. In 1880 he returned to Gatehouse-of-Fleet, and his recent pictures have been chiefly landscapes.

FAED, THOMAS, R. A., brother of John Faed, born at Burley Mill, June 8, 1826, and in 1842 began his regular art studies in Edinburgh. At the Trustees Academy he took several prizes. In 1849 he was made an associate of the Royal Scottish Academy; in 1861 he was made A. R. A. and R. A. in 1864, and elected an honorary member of the Vienna Royal Academy in 1875.

FAGGING, a usage in the great public schools of England, in virtue of which the senior boys are authorized to exact a variety of services from the junior boys. A lower form boy has certain duties to perform to all the upper form boys, as in stopping the balls for them when practicing cricket—and others which he owes to a special master, such as stoking his fire and carrying his messages of a more or less private kind. In American colleges the freedom taken, under the name of *hazing*, by sophomore and senior students with freshmen, is open to even more serious objections.

FAGOT-VOTES, votes manufactured chiefly for county elections, by the nominal sale of property, under mortgage or otherwise, so as to qualify the holder to vote. The term *fagot* described formerly a person who was hired to fill up another's place at the muster of a regiment, or to conceal a deficiency in its strength.

FAIDHERBE, LOUIS LÉON CÉSAR, French general, statesman, and archaeologist, born at Lille, June 3, 1818, died in 1889. He studied at the École Polytechnique and at Metz, afterwards serving as a military engineer in Algeria and the West Indies. Made governor of Senegal in 1854, he rendered the French dominion in Africa great service by his accurate knowledge of the country and its population. At the commencement of the war with Germany he had command of Bona in Algeria, and when the armies were reorganized in 1870 he was appointed general of division and commander-in-chief of the North. He commanded in the battle of Point-Noyelles, relieving Havre from siege, and also in that of Bayaume. Although his little practiced forces were afterwards defeated by the Germans, he proved himself a very able commander.

Joining the party of Gambetta, he was elected to the national assembly in 1871. He retired from public life when the government of Thiers came into power. He was sent on a scientific expedition to Egypt, and subsequently published several works on archaeological topics. He also published a book on the war, *Campagne de l'Armée du Nord*. Gen. Faidherbe was grand-chancellor of the Legion of Honor.

FAIENCE, or FAYENCE, a general term for all sorts of glazed earthenware and porcelain. The origin of the name is disputed. Some derive it from Fayence, a small town of Provence, others from Faenza, a city of Italy; while certain writers consider the Isle of Majorca the place where it was originally manufactured, as the Italians still call faience *Majolica* or *Mayolina*.

FAI-FO, a seaport of Anam in Cochinchina in the province of Quang-Nam situated on a river, near its mouth, communicating with Tooron, 15 miles to the north, by means of a canal. It exports sugar and cinnamon, its principal trade being with China. Population, 15,501.

FAILLON, MICHEL E. (1799-1870). He was a priest of the Sulpician order, who came from Paris to Canada as visitor to Sulpician houses of the country, and wrote biographies and histories of the French in Canada.

FAILLY, DE CHARLES ACHILLE, born in 1810, a French general, who introduced the Chassepot gun.

FAIRBAIRN, SIR ANDREW, born at Glasgow in 1828, was educated at Leeds, Geneva and Glasgow, and in 1846 became a pensioner at Christ's College, Cambridge. He was called to the bar at the Inner Temple in 1852, and attended Northern Circuit until 1856. He then relinquished practice, and in 1860 became a partner in the firm of his father, on whose death in 1861 he succeeded to the business. In 1866 he was elected mayor of Leeds, and in 1873 was appointed royal commissioner to the Paris exhibition. In 1880 he was member for the eastern division of the West Riding, and in 1885 the first representative of the Otley division. The same year he was appointed vice-president of the railway congress at Brussels, and was made a knight commander of the order of Leopold by the king of the Belgians.

FAIRBAIRN, ANDREW M., theologian, principal since 1886 of Mansfield College, Oxford, was born in 1838 in Edinburgh, Scotland, and educated at the Universities of that place, of Glasgow and of Berlin. His first pastorate, in 1860, was at Bathgate, Linlithgow, Scotland. In 1877 he was principal of Airedale (Congregational) College at Bradford, England, and in 1883 was chairman of the Congregational Union of England and Wales. Dr. Fairbairn has written *Studies in the Philosophy of Religion and History*, *Studies in the Life of Christ*, and other works, and is an eloquent preacher. He visited America in 1890.

FAIRBAIRN, PATRICK, D.D., born in Scotland in 1805, died in 1874. He was principal and professor of systematic theology and New Testament exegesis in the Free Church Theological College of Glasgow. He visited the United States in 1871.

FAIRBANKS, ERASTUS (1792-1864), an American manufacturer. In 1824, with his brother Thaddeus, he began the manufacture of cast-iron plows and stove-castings, in St. Johnsbury, Vt., and in 1831 they gave their entire attention to making platform scales. In 1836-38 Erastus was a member of the legislature, and in 1849 was president of the Passumpsic Railroad company; in 1851 and again in 1860 was elected governor of Vermont.

FAIRBURY, the county-seat of Jefferson county, Neb., on the Little Blue River. It has fine water-

power, flouring-mills, soap factory, and tree-packing house of a large nursery. Pop. (1890), 2,630.

FAIRBURY, a town of Livingston county, Ill., situated in a fertile region where coal, limestone, sandstone, fire-clay, micaceous quartz and clay of nearly every color are found. The town has grain elevators, mills and factories. Pop. (1890), 2,324.

FAIRCHILD, JAMES HARRIS, an American divine and educator, born at Stockbridge, Mass., in 1817. He entered Oberlin College in 1833; became tutor in 1839; professor of languages in 1842; of mathematics in 1852; of theology in 1858, and was made president in 1866. He has edited *Memoirs of Charles G. Finney* (1876), and *Finney's Systematic Theology* (1878), and is the author of *Oberlin, the Colony and the College* (1833), *Moral Philosophy* (1869), and *Women's Right to the Ballot* (1870).

FAIRCHILD, LUCIUS, an American statesman, born in 1831. He was admitted to the Wisconsin bar in 1860. At the beginning of the civil war he entered the Federal army as captain in the 1st Wisconsin regiment, and three months later was commissioned a captain in the 16th regiment of the Regular Army, and about the same time a major in the 2d Wisconsin infantry. In 1863 he became a brigadier-general, and the same year was elected Secretary of State in Wisconsin. From 1865 to 1871 he was governor of the State; was United States consul at Liverpool from 1872 to 1878; was consul-general in Paris from 1878 to 1880, and United States minister to Spain in 1880-82. In 1886 he became commander-in-chief of the Grand Army of the Republic.

FAIRFAX, a village of Franklin county, Vt. It has the New Hampton Theological and Literary Institution (Baptist), and manufactories of woollens, lumber and leather. Population (1890), 1,523.

FAIRFIELD, the county-seat of Wayne county, Ill. It contains a woolen factory, flour and saw mills. Population (1890), 1,881.

FAIRFIELD, a city and county-seat of Jefferson county, Iowa. It is the seat of Parsons College and a female seminary. Population (1890), 3,391.

FAIRFIELD, a village of Somerset county, Me., on the Kennebec River, 21 miles north of Augusta. It has canning factories, furniture factories, a tannery, foundry and a framing-mill, where buildings are manufactured entire. Population (1890), 3,510.

FAIRFIELD, the county-seat of Freestone county, Texas. It has two colleges.

FAIRFORD, a village of Gloucestershire, nine miles east of Cirencester, and 26 miles west southwest of Oxford. Its fine church, built in the 15th century, is famous for its series of 28 stained-glass windows. Keble was a native. Population of Parish, 1,525.

FAIRHAVEN, a manufacturing town of Vermont, about nine miles northeast of Whitehall, N. Y. It contains extensive quarries and manufactories of marble and slate. Pop. (1890), 2,791.

FAIRHAVEN, a village of Bristol county, Mass., on the east side of New Bedford harbor, 60 miles south of Boston. The harbor is good and the town manufactures ships' furnaces, tacks, metallic wares and castings. Population (1890), 2,919.

FAIR HEAD, or BENMORE, a precipitous promontory of the north coast of Antrim, Ireland, opposite Rathlin Isle, four miles to the northwest. It rises 636 feet above the sea, and consists of carboniferous strata, overlaid by greenstone columns, 20 to 30 feet thick, and 280 to 300 feet high.

FAIR ISLE, a solitary island in the Atlantic, 25 miles from Shetland. It is four by two and one-half miles in extent, and rises 708 feet above the sea, with high rocky cliffs and promontories. The population, chiefly fishers, is 226.

FAIRMONT, the county-seat of Marion county, W. Va., situated at the head of navigation on the Monongahela River. It contains a State normal school, shops and mills, and there are coal mines in the vicinity.

FAIR OAKS, near Chickahominy, Va., the scene of a battle fought May 31 and June 1, 1862, between the Union forces under Gen. McClellan and the Confederates under Gen. Johnston, in which the latter were forced to retreat with a loss of about 8,000, the Federal army having lost nearly 6,000.

FAIRPLAY, the county-seat of Pike county, Col., at the head of South Park, 117 miles from Denver. It is at an altitude of 9,964 feet above sea level, and is the point whence Mount Lincoln mining district derives its supplies.

FAIRPORT, a village of Monroe county, N. Y., 11 miles east of Rochester. It has manufactories of cream of tartar, baking-powder, flour, saleratus, barrels, staves, carriages, confectionery, canned goods, etc. Population (1890), 2,552.

FAIRVILLE, a village of St. John county, N. B., on St. John River, 2½ miles from St. John. It contains the New Brunswick Lunatic Asylum.

FAITH. See Britannica, Vol. III, pp. 532-35; also Vol. XXIII, p. 264.

FAITH-CURE, or FAITH-HEALING, the treatment of sickness by prayer, and the exercise of faith in God, without medical advice or appliances. Dorothea Trudel, at Männedorf, Switzerland, between 1850 and 1860, wrought many cures by faith and prayer; but the recent movement in favor of faith-healing, which is conspicuous in Sweden and in the United States, is the outcome of the success of Pastor Blumhardt, at Müttlingen in Würtemberg, and afterwards at Boll, near Göppingen. There are homes for faith-healing at various places in Great Britain and in the United States.

FAITH, RULE OF, that which faith adopts as its guide. The Bible, in Protestant churches, is accepted as the sole rule of faith. In the Roman Catholic church the rule of faith is the body of revealed truth contained in the Scriptures and traditions.

FAITHFULL, EMILY, an English philanthropist, born at Headley rectory, Surrey, in 1835, educated at Kensington, and in early life devoted herself to ameliorating the condition of working-women, and extending their sphere of labor. She learned the art of type-setting, and in 1860 established a printing-office where only female compositors were employed. The project was approved by Queen Victoria, and the business was styled the Victoria Press. The publication of a handsome book entitled *Victoria Regia*, and dedicated by permission to the queen, led to Miss Faithfull's appointment as publisher in ordinary to Her Majesty. In 1863 the "Victoria Magazine, a publication devoted to the rights of women, was commenced. Miss Faithfull has won a high reputation as a lecturer on her favorite topic, not only in England, but in the United States, which she has twice visited. She is author of *Change Upon Change* (1868), *A Reed Shaken With the Wind* (1873), and a number of other works. In 1889 she was awarded a civil-list pension of fifty pounds.

FAIZPUR, a town of Bombay presidency, about 200 miles east of Surat, with a reputation for its dark-blue and red dyes and cotton prints. Population, 9,640.

FALCKENSTEIN, VON EDUARD V., born in Silesia in 1797, a Russian general who distinguished himself at the battles of Katzbach and Montmirail, when only 17, and afterwards served in the campaign of Holstein, and in the wars of 1866.

FALCON. See Britannica, Vol. IX, pp. 2-4.

FALCONER, THE HON. ION KEITH (1856-87), orientalist, missionary, and athlete, born in Edinburgh, July 5, 1856. From Harrow he went to Cambridge, and there he began evangelistic work. In London he aided by personal effort in founding an assembly hall, to which he contributed \$10,000. A keen cyclist, he defeated in 1878 the fastest rider in the world, and rode from Land's End to John O'Groats. He was author of the article "Short-hand," in the *ENCYCLOPEDIA BRITANNICA*. He had accepted the Lord Almoner's professorship of Arabic at Cambridge, and was settled at Shaikh Othman, near Aden, as a missionary, when his promising career was cut short by fever, May 10, 1887.

FALCONET, a name used in the 15th and 16th centuries for a small field-gun. The ball weighed from one to two pounds; and the gun from five to fifteen hundred weight.

FALCONIDÆ, a large family of birds of prey. The muscular strength and power of flight; the habit of preying upon living animals, and that in daylight; the world-wide representation by over 300 species, are to be noted. The beak is rather short, but very strong, and highest at the root; the partition between the nostrils is complete; the upper margin of the eye-socket projects; the feet bear strong, sharp, rending claws and large solepads. The family includes the falcons *par excellence*; the eagles; the buzzards; the kites; the hawks; the harriers; and the caracaras.

FALDSTOOL, a small desk in churches in England, at which the litany should be sung or said. The name is also given to a folding stool used by Roman Catholic bishops and other prelates on certain occasions.

FALEME, one of the most important tributaries of the Senegal. It rises in Futa-Jallon, flows north and joins the main stream above Bakel. About 120 miles above its mouth the Faleme is interrupted by rapids and waterfalls. Up to that point it is navigable for small steamers during two months of the year.

FALERNIAN WINE, one of the favorite wines of the Romans. It is described by Horace as surpassing all other wines then in repute; but in the time of Pliny Falernian wine had begun to decline in quality.

FALK, PAUL LUDWIG ADALBERT, German jurist and statesman, born at Metshkau in Silesia, Aug. 10, 1827, and educated at the gymnasium and University of Breslau. He began his legal career in 1847, and in 1862 became counselor of the court of appeals at Glogau, and on the formation of the North German Confederation in 1867 was elected representative of Glogau. In 1868 he was assigned as privy counselor to the ministry of justice, and was employed in the codification of the laws of the German Empire. Made a representative of Prussia in the imperial council, Dr. Falk was minister of public worship and instruction in 1872, when Prince Bismarck decided on curtailing the privileges of the Roman Catholic church, and it was he who brought forward the repressive measures (see *Britannica*, Vol. X, p. 513). It was through the agitation caused by the passage and attempt to enforce these laws that Dr. Falk's name became widely known. When negotiations were begun for the restoration of harmony between church and state he retired from office. A peerage was offered to him, which he accepted for his son. In 1882 he was appointed to the presidency of the court at Hamm.

FALKLAND ISLANDS, otherwise called *Les Îles Malouines*, a British colony in the South Atlantic. For history and earlier statistics, see *Britan-*

nica, Vol. IX, pp. 14-16. South Georgia, an island 800 miles east-southeast, has been annexed to the colony. Its area is 1,570 square miles, but it is snow-covered, sterile, and uninhabited. The present area of the Falklands is 8,070 square miles, with a total population of 1,890. The chief town is Stanley, with a population of 700. The government is administered by the governor, assisted by an executive council and a legislative council. There were in 1889 two government schools, with 142 pupils; one private school with 71 pupils, and one school at Darwin with 22 pupils. There are no naval or military forces. The total revenue for 1889 was £8,628; expenditures, £9,720; imports, £55,716; and exports, £116,102. Sheep-farming is the chief industry, 2,325,154 acres being devoted to sheep pasturage. In 1887 there were in the colony 2,173 horses, 8,169 cattle, and 582,410 sheep.

FALL, the name applied in theology to the change of state with respect to sin which befell Adam and Eve in Eden. The Fall was due to an external temptation offered by the devil, and sin and a corrupted nature are the inheritance through the first sinners of all their natural descendants.

FALLACY, the incorrect performance of the process of reasoning so as to lead to error. The science of logic reduces sound reasoning to certain rules, and when any of these rules are violated a logical fallacy is the result. The time-honored division was into two classes, according as the error lay in the *form* of the reasoning or in the *matter*; the formal were entitled *in dictione*, or those appearing in the expression; the material were entitled *extra dictionem*, implying that the fault could not be detected from the language, but must be sought in a consideration of the meaning or subject-matter. Other classifications have been carried out, but owing to the variety and intricacy of inaccurate and confused modes of thought it is difficult to draw up a scheme at once complete and rigorously scientific.

FALLS CITY, the county-seat of Richardson county, Neb., in the Great Nemaha Valley, 9 miles west of the Missouri River. It contains flour mills, pork-packing house, a foundry, a broom factory, a windmill factory, and steam elevators. Pop., 2,102.

FALLING BODIES. All bodies, no matter how unequal in weight, fall in the same time *in vacuo*, from any given height. It is the resistance of the atmosphere only which causes the difference of time in descent, the descent itself being caused by gravity. Experiment has proved that a body moving freely through space falls 16.1 feet a second, and that, continuing its course, it would during the next second pass through a space of 32.2 feet, which is the measure of the accelerating force of gravity.

FALLOUX, ALFRED PIERRE, Comte de, French statesman, born at Angers, May 7, 1811, died Jan. 7, 1886. He first became known by his *Histoire de Louis XVI* (1840), a Legitimist work; and *Histoire de Pie V* (1844). As a Legitimist he was elected to the chamber of deputies in 1846. He recognized the Republic in 1848, and became a member of the Constituent Assembly, and when Louis Napoleon was elected president, was made minister of public instruction. He retired from public life in 1851, became one of the editors of the "Correspondent" in 1855, was admitted to the French Academy in 1856. Among his later works are: *Madame Swetchine, sa Vie et ses Œuvres* (1859); *Dix Ans d'Agriculture* (1863); and *Questions Monarchiques* (1873). He also edited a collection of the letters of Madame Swetchine (1866).

FALLOWS, SAMUEL, an American Reformed Episcopal church bishop, born in 1835. In 1859 he became vice-president of Gainesville, Wis. University, and in 1861 was ordained in the Methodist Episcopal church. He served in the civil war, and was brevetted brigadier-general. Later he was a pastor in Milwaukee, and in 1871 became State superintendent of public instruction for Wisconsin, twice receiving a reelection. In 1874 he became president of the Illinois Wesleyan University. In 1875 he was made rector of St. Paul's Reformed Episcopal church, Chicago, and the following year became editor of the "Appeal," the organ of the Reformed Episcopal church. In July of the same year he was chosen bishop. From 1864 to 1874 he was regent of the University of Wisconsin.

FALL RIVER, a city of Massachusetts (see Britannica, Vol. IX, p. 16). Fall River has now become the greatest cotton manufacturing center in America. In 1891 the number of cotton manufacturing companies was 40, owning 65 mills, with an incorporated capital of \$20,643,000, and a probable investment of \$40,000,000. These mills contained 2,128,228 spindles, which is nearly one-sixth of all the spindles in the country, and about one-fifth of all in New England. The mills contain 49,586 looms, and manufacture three-fifths of all American print cloths. The bleaching and dyeing of cotton goods is carried on extensively, as is also the printing of calicoes. The streets of the city are broad, well shaded and paved, and lighted with both gas and electricity. The United States Custom-house and postoffice building is one of the finest Government buildings in the country. It is built of gray rock-faced ashlar, with trimmings of red and gray granite, and was completed in 1880. The city hall is also a fine building. The city is well supplied with excellent schools. The city annually appropriates \$175,000 for the support of the high school, which has English, classical, and mixed courses. The Durfee High School building was donated to the city in 1887, and is a stately granite structure, thoroughly equipped, with astronomical observatory, and chemical and philosophical apparatus. A free public library contains 36,000 volumes. Population in 1880, 47,883; in 1890, 74,351.

FALLS OF MONTMORENCY, a cataract of 250 feet, where the Montmorency River empties into the St. Lawrence, near Quebec, Can. Singular ice cones form here in winter.

FALMOUTH, a seaside resort of Barnstable county, Mass., at the west end of Cape Cod, on Buzzard's Bay. Population, 2,567.

FALSE BAY, an inlet of the Atlantic in Cape Colony, Africa, its west side being formed by the Cape of Good Hope. It is about 22 miles in length and breadth. It is a station of the Cape naval squadron.

FALSETTO, a term in singing for the highest register of a man's voice, which joins the natural or chest-voice, and which, by practice, may be so blended with the chest-voice as to make no perceptible break.

FALSIFYING RECORDS. Injuring or falsifying any of the documents of a court of justice is, by several statutes, made a serious offense. Any person obliterating, injuring, or destroying any record, writ, etc., or any original document belonging to any court of record or of equity, is guilty of felony, and is liable to be punished by two years' imprisonment, with or without hard labor.

FALUNS, a term given by the agriculturists of Touraine to shelly sand and marl, which they use as manure, and applied by geologists to the deposits from which they are obtained.

FAMA, the goddess of rumor, a personification which appears in the works of the earliest poets. Sophocles makes her the child of Hope; Virgil, the youngest daughter of Terra, and sister of Enceladus and Coeus.

FAMA CLAMOSA: in the ecclesiastical law of Scotland, a widespread and prevailing report imputing immoral conduct to a minister, probationer, or elder of the church.

FAMILIAR, or **FAMILIAR SPIRIT**, a supernatural being in attendance upon a magician, wizard, or other professor of the black art. The word familiar is probably derived from the Latin *familus* (a domestic, a slave). The belief in such spirits goes far back into the history of the race. We read of them in the time of Moses, who admonishes his countrymen to "regard not them that have familiar spirits" (Lev. xix, 31), which would imply the prevalence of the superstition among the Egyptians.

FAMILY: in zoölogical classification, an alliance of nearly related genera.

FAMINE PORT, an abortive settlement of Spain on the northern side of the Strait of Magellan. It owes its name to the death, by starvation, of the Spanish garrison.

FANARIOTS, the general name given to the Greeks inhabiting the Fanar, or Fanal, in Constantinople. They first appear in history after the taking of Constantinople by the Turks.

FANDANGO, an old Spanish national dance in 3-time. It is danced most gracefully in the south country, usually to the accompaniment of a guitar, while the dancers beat time with castanets. It proceeds gradually from a slow and uniform to the liveliest motion, and expresses vividly all the gradations of the passion of love.

FANEUIL, PETER (1700-43), an American merchant. In 1742 he built at his own cost, as a gift to Boston, Mass., a public market-house. This building was destroyed by fire in 1761, but was rebuilt in 1763, and in 1775 was used as a theater. During the Revolutionary period it was the usual meeting-place of the patriots, and gained the name of "the cradle of American Liberty."

FANFARE, the French name of a 'short and lively military call executed on brass instruments. It was first introduced by the Arabs.

FANG: in the technical terminology of the law of Scotland, a thief taken *with the fang* is one apprehended while carrying stolen goods on his person. The fangs of a dog or of a serpent are its teeth with which it catches or holds.

FANINO FAVENTINO, a Protestant martyr of Italy, who, being arrested at Bagna Cavallo in 1548, was visited in prison by many distinguished Italians. Pope Julius III condemned him to the stake. He was strangled and his body burned in 1550.

FANNER, a machine employed to winnow grain, driven by hand or other power. In passing through the machine the grain is rapidly agitated in a sieve, and as it falls through a strong current of wind, created by a rotary fan, the chaff is blown out at one end, while the cleansed particles fall through an orifice beneath.

FANNING, a coral island in the Pacific, lying in 3° 51' N. lat. and 159° 22' W. long. It has about 150 inhabitants, and was formally annexed by Britain in 1888, as lying in the path of a possible submarine cable between Canada and Australia. Fanning Island is also called American Island. The name of Fanning Islands is sometimes given to the group comprising Fanning, Christmas, New York or Washington, Jarvis, and Palmyra Islands.

FANNING, EDMUND, born in Long Island in 1737, died in London, England, 1818. He was graduated at Yale in 1757, and practiced law in Hillsborough, N. C. He also became recorder of deeds, and was a stern Loyalist, who treated all opposition to authority with extreme severity. Governor Tryon was his father-in-law, and, in 1771, when the people rose en masse against his authority, he followed Governor Tryon to New York city as his private secretary. In 1777 he organized a corps called the "King's American Regiment." Later he went to Nova Scotia, where, in 1783, he became councillor and lieutenant-governor; in 1786 he was governor of Prince Edward Island.

FAN-TRACERY VAULTING, a kind of Late Gothic vaulting (15th and 16th centuries), so called from its resemblance to a fan. The ribs or veins spring from one point, the cap of the vaulting shaft, and radiate with the same curvature, and at equal intervals, round the surface of an inverted curved cone or polygon, till they reach the semi-circular or polygonal ribs which bound the upper part of the cone and divide the roof horizontally at the ridge level into diamond and other patterns. The spaces between the ribs are filled with foils and cusps, resembling the tracery of a Gothic window; hence the name *fan-tracery*.

FARADIZATION: in medicine, the application of Faradic or inductive electricity to the animal frame. It is named after Faraday.

FAREWELL, CAPE, the southern extremity of Greenland. It is generally beset with ice, which appears to come from the northeast, and sweep around into Davis Strait. It lies in latitude 59° 49' north, and longitude 43° 54' west.

FARGO, a city and county-seat of Cass county, North Dakota, at the head of navigation on the Red River of the North, opposite Moorehead, Minn. It is a great wheat market, has the largest farm-machinery depot in the northwest, contains a Presbyterian seminary, Roman Catholic academy, Congregational College, and is furnished with water works, gas and electric lights, and a telephone system. Population (1890), 5,664.

FARIBAULT, a city and county-seat of Rice county, Minn., at the confluence of the Straight and Cannon Rivers. It contains a number of manufactories, a State asylum for the deaf, dumb and blind, an Episcopal divinity college, and five seminaries. Population (1890), 6,520.

FARISAN ARCHIPELAGO, a group of islands in the southeast of the Red Sea, the chief of which are Farsan Kebeer, 31 miles long, and Farsan Seggeer, 18 miles long. In latitude 16° 30' north, and longitude 41° 45' to 42° 10' east.

FARJEON, BENJAMIN LEOPOLD, born in London, England, of Jewish parentage, May 12, 1833. He spent some years in New Zealand, and in 1869 returned to London, where he issued several novels, of which *Blade o' Grass* and *London's Heart* are best known. In 1877 he married a daughter of Joseph Jefferson.

FARM, a tract of land, consisting usually of grass lands, meadow, pasture, tillage and woodland, devoted to agricultural pursuits, and under the management of the owner, or a tenant. In the United States, with a land area of 1,900,800,000 acres, in 1880 there were 4,008,907 farms, with a total farming area of 536,081,835 acres. Of this area 284,771,042 acres was improved land, and 251,310,773 unimproved thus giving an average of 71 acres of improved and 62 acres of unimproved land to each farm. In 1880 the value of the total improved farming land of the United States was \$10,197,096,776; the value of farming implements and machinery \$406,520,055; and the value of farm

products of 1879, \$2,213,402,564. The census of 1880 showed the increase in the number of acres of improved land to be 52 per cent of the improved land of 1870; the increase in the value of farms to be 30.7 per cent; and the increase in the value of implements to be 52 per cent.

AVERAGE YIELDS AND VALUES OF FARM CROPS FOR TEN YEARS.—An examination of the report of the statistician of the U. S. Agricultural Department, bearing date June 16, 1890, shows a wide range in both yield and value per acre during the last decade. Tobacco has the highest average, \$61.51. That of potatoes is \$38.34. Cotton, the third in order, drops to \$15.69. Hay makes an average of \$11.08. The cereals fall below \$10 per acre, excepting only barley, which is not grown in sufficient quantities to meet the requirements of consumption, and averages \$12.76 per acre; 28 per cent more than the average of wheat for the same period. The average for corn is \$9.47; that of rye, \$8.27; of buckwheat, \$8.24; and of oats, \$8.16.

The cost of cultivating and harvesting tobacco and potatoes is considerable, yet the opportunity for larger net returns for superintendency and use of land is greater in the case of large gross returns per acre. Considering the cost of picking and ginning, as well as the labor of cultivation, the value of cotton per acre is not greatly in excess of that of cereals. The value of cereals suggests an excess of breadth cultivated and a minimum of labor in cultivation, which account for the low yields and small net profits. It indicates the fact that the era of extensive culture awaits the scarcity and appreciating value of fresh lands. The extremes in value per acre of corn are \$24.32 and \$6.19. Eighteen States and Territories averaged above \$15. Half of these are east of the Alleghanies and north of Delaware; the other half on the Pacific coast and in the Rocky Mountain region. In the former the cause is found in large yield and high prices, both the result of demand for consumption by a large proportion of the population engaged in non-agricultural industries. In the latter the climate is not so well suited to maize, and mining and manufacturing stimulate demand. Where prices are lowest there is either an excessive production or a very low rate of yield. It requires nearly four acres in South Carolina to equal the value of one in New Hampshire, and it requires more than three acres in Nebraska, which makes the highest average rate of yield, to produce the value of one in the Granite State. These diverse results depend far more upon inequalities in distribution of population, and especially in the ratio of consumers to producers, than upon climate or soil. In wheat and other cereals, potatoes, hay, and all farm products of general geographical distribution, similar differences are found to result from similar causes.

The tabulation of rate of yield per acre makes the following averages for 10 years, which are stated in connection with averages of value per acre:

Yearly Productions.	Value.	Yield.
Corn, bushels	\$9.47	24.1
Wheat, "	9.95	12.0
Oats, "	8.16	26.6
Rye, "	8.27	11.9
Barley, "	12.76	21.7
Buckwheat, "	8.24	12.8
Potatoes, "	38.34	76.2
Tobacco, pounds	61.51	727.1
Cotton, "	15.69	168.1
Hay, tons	11.08	1.19

The past decade has been marked by several years of drought, which have reduced the rate of yield below the average of the preceding decade, a period comparatively exempt from dry seasons. The years of sufficient rainfall show no diminution of rate of yield.

The tables following show the average yield and value per acre by States of the various farm crops for a period of 10 years, 1880 to 1890, inclusive.

See AGRICULTURE, in these Revisions and Additions. Also see Britannica, Vol. I, pp. 219-416.

FARM CROPS.

States and Territories.	Corn (Maize).		Wheat.		Oats.		Rye.		Barley.	
	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.
		Bushels.		Bushels.		Bushels.		Bushels.		Bushels.
Maine	\$24.25	32.2	17.42	13.6	12.42	28.3	12.26	13.0	16.02	21.6
New Hampshire.....	24.32	32.7	18.24	14.4	14.63	32.3	9.98	11.0	15.94	21.8
Vermont.....	23.18	32.5	19.75	16.9	13.87	33.1	11.85	14.5	18.05	24.7
Massachusetts	22.94	31.6	20.74	16.3	14.44	29.9	12.46	14.3	18.77	23.2
Rhode Island.....	22.93	30.2			13.52	27.9	10.49	12.1	19.13	23.9
Connecticut.....	20.94	30.1	19.14	16.6	12.82	28.1	10.89	13.5	16.43	21.5
New York.....	18.39	29.8	15.03	14.7	11.12	28.5	8.51	11.9	16.91	22.7
New Jersey.....	17.83	30.5	13.58	12.9	10.57	26.7	7.75	10.3	13.66	17.0
Pennsylvania	17.16	31.0	13.66	12.6	10.51	28.0	7.34	10.6	14.74	20.1
Delaware.....	9.05	19.2	11.67	11.6	7.82	28.1	5.50	8.3		
Maryland.....	11.88	24.1	19.09	12.2	7.29	20.1	7.13	10.3	20.47	25.5
Virginia.....	8.46	16.8	8.05	8.2	4.73	11.9	4.71	6.9	12.01	16.1
North Carolina.....	7.15	12.2	6.42	6.0	4.56	9.5	4.32	5.8	9.65	11.0
South Carolina.....	6.19	9.4	6.73	5.7	6.18	10.3	5.09	4.6	14.88	14.2
Georgia	6.81	10.5	7.01	6.0	5.85	9.8	6.07	5.5	13.57	14.0
Florida.....	7.22	9.7			7.04	10.2				
Alabama.....	7.69	12.7	6.60	6.0	6.36	10.8	6.28	5.5	11.38	10.4
Mississippi.....	8.47	14.3	6.35	5.7	6.40	11.0	7.29	6.5		
Louisiana	9.54	16.0			7.07	12.5	11.19	8.3		
Texas.....	9.52	18.0	9.25	10.0	9.98	23.4	8.51	9.7	10.79	15.9
Arkansas.....	10.07	19.7	7.23	7.5	7.68	16.9	6.57	7.4		
Tennessee.....	8.92	20.6	5.95	6.7	5.20	13.7	4.67	6.2	9.27	13.4
West Virginia.....	11.80	23.4	9.63	10.2	6.47	17.7	6.09	8.5	12.93	19.3
Kentucky	9.97	23.8	8.23	9.4	6.56	13.2	6.23	9.0	14.15	21.0
Ohio.....	13.16	30.9	12.42	13.6	9.73	30.9	7.61	12.0	15.00	20.6
Michigan.....	13.16	28.9	13.40	15.2	10.44	32.3	7.69	12.0	15.96	23.1
Indiana.....	10.84	28.9	11.36	13.1	7.88	27.5	6.97	11.4	14.96	21.8
Illinois.....	9.38	26.7	11.32	13.4	8.95	24.2	8.36	15.5	12.88	21.0
Wisconsin.....	11.04	27.2	10.03	12.0	8.68	30.4	7.86	13.4	12.67	22.7
Minnesota.....	10.86	29.6	9.31	12.5	8.63	33.1	7.20	14.5	10.93	23.1
Iowa.....	8.63	30.9	7.56	10.6	7.34	32.3	6.42	12.9	10.34	21.3
Missouri.....	8.94	27.4	9.23	11.7	6.96	26.0	6.66	11.8	12.04	20.3
Kansas.....	7.90	28.5	9.41	13.9	6.64	28.0	6.12	15.2	7.90	18.9
Nebraska.....	7.53	23.8	6.87	11.1	5.78	29.1	5.51	13.3	7.5	19.6
California.....	13.99	27.9	10.35	12.5	13.74	26.2	8.34	10.5	12.77	20.4
Oregon.....	16.85	23.8	13.02	16.3	11.48	27.9	11.88	15.9	14.25	26.0
Nevada.....	17.60	24.6	15.96	17.6	13.15	29.8			13.29	22.2
Colorado.....	17.77	26.7	16.22	19.5	14.97	31.2	12.78	17.1	17.43	24.5
Arizona.....	16.73	20.9	12.73	13.8					14.03	19.2
Dakota.....	8.67	25.4	7.52	11.9	7.29	27.7	7.21	14.9	9.02	21.3

FARM CROPS (Continued).

States and Territories.	Corn (Maize).		Wheat.		Oats.		Rye.		Barley.	
	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.
		Bushels.		Bushels.		Bushels.		Bushels.		Bushels.
Idaho.....	\$18.28	23.2	\$14.17	17.1	\$15.09	30.9	\$8.41	13.0	\$18.06	27.2
Montana.....	20.12	26.2	14.48	17.6	15.24	32.6			18.03	27.2
New Mexico.....	15.04	19.9	12.93	13.6	10.78	22.7			14.98	19.6
Utah.....	13.54	19.7	12.71	17.2	11.29	26.3	6.85	10.8	12.60	22.6
Washington.....	17.50	24.3	12.16	17.2	15.08	36.0	11.17	15.1	16.54	29.1
Wyoming.....			14.87	18.0	13.78	29.7				

States and Territories.	Buckwheat.		Potatoes.		Tobacco.		Cotton.		Hay.	
	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.
		Bushels.		Bushels.		Pounds.		Pounds.		Tons.
Maine.....	\$10.14	18.1	\$51.48	94.5					\$11.31	.97
New Hampshire.....	10.90	17.4	46.64	89.3					11.08	.93
Vermont.....	10.88	18.2	47.06	97.7					11.08	1.05
Massachusetts.....	10.01	14.2	61.97	95.5	\$204.28	1485.4			18.82	1.09
Rhode Island.....	8.25	10.4	62.55	91.8					16.19	.96
Connecticut.....	8.49	12.1	53.60	80.6	196.58	1417.1			15.91	.99
New York.....	8.22	13.4	37.79	78.0	159.56	1339.6			13.67	1.11
New Jersey.....	8.34	11.9	47.26	77.6					16.79	1.09
Pennsylvania.....	8.42	13.0	37.59	73.0	113.22	1205.3			14.00	1.14
Delaware.....	9.45	14.3	37.77	66.3					14.60	1.04
Maryland.....	8.84	13.0	37.68	67.8	44.24	602.7			14.47	1.07
Virginia.....	7.04	10.8	34.29	60.7	44.85	596.1	\$13.96	158.9	13.64	1.10
North Carolina.....	16.10	9.7	38.33	60.7	51.21	480.8	16.26	180.7	13.45	1.16
South Carolina.....			46.11	55.0			14.40	157.8	15.71	1.15
Georgia.....			53.10	58.8			13.11	145.9	17.31	1.23
Florida.....			65.65	68.3			11.16	106.4	16.37	.98
Alabama.....			56.02	62.1			12.43	140.1	16.54	1.21
Mississippi.....			53.01	62.3			17.21	194.4	16.16	1.28
Louisiana.....			54.03	62.8			20.83	232.7	14.50	1.22
Texas.....			58.21	62.5			16.92	199.1	12.20	1.26
Arkansas.....			47.14	68.5	50.22	578.0	20.08	229.8	13.90	1.23
Tennessee.....	5.66	8.5	30.49	59.2	48.30	645.4	16.54	189.2	14.14	1.21
West Virginia.....	6.66	10.0	34.90	65.7	56.29	609.5			10.41	1.01
Kentucky.....	6.88	9.5	30.90	61.3	58.63	755.2			12.70	1.16
Ohio.....	8.24	11.0	33.54	68.7	67.28	912.8			12.71	1.21
Michigan.....	8.75	13.3	32.02	76.7	64.24	503.6			13.22	1.23
Indiana.....	7.72	10.4	31.00	66.0	49.43	721.7			11.35	1.26

FARM CROPS (Continued).

State and Territories.	Buckwheat.		Potatoes.		Tobacco.		Cotton.		Hay.	
	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.	Average value per acre.	Average yield per acre.
		Bushels.		Bushels.		Pounds.				Tons.
Illinois.....	\$7.65	10.3	\$35.24	71.9	\$48.18	651.9			\$10.26	1.29
Wisconsin.....	6.75	10.3	35.96	81.9	101.45	967.2			9.21	1.17
Minnesota.....	6.82	10.5	35.43	92.3					6.76	1.32
Iowa.....	7.60	10.9	32.51	79.3					6.39	1.23
Missouri.....	7.81	11.4	32.37	70.3	63.27	802.4			9.38	1.20
Kansas.....	8.72	11.1	40.07	66.7					5.55	1.28
Nebraska.....	7.25	10.2	30.68	74.1					4.82	1.31
California.....	15.69	20.8	56.61	86.8					16.02	1.39
Oregon.....	10.23	14.2	47.75	100.0					14.45	1.39
Nevada.....			76.25	91.1					12.95	1.24
Colorado.....			53.12	89.3					15.76	1.25
Arizona.....			50.65	63.8					13.71	1.07
Dakota.....	6.80	11.3	35.17	83.0					5.10	1.30
Idaho.....			58.62	101.3					11.26	1.19
Montana.....			73.03	107.4					12.53	1.15
New Mexico.....			61.27	78.3					13.52	1.08
Utah.....			37.89	90.5					8.35	1.23
Washington.....			54.91	117.1					13.10	1.31
Wyoming.....			53.91	95.5					11.41	1.17

FARMINGTON, a village of Hartford county, Conn., on Farmington River. It has important manufactories, and a population of 3,179.

FARMINGTON, the county-seat of Franklin county, Me. It contains a State normal school, other excellent schools, machine shops, saw, shingle and clapboard mills, a drum factory, a spool factory. Population, 1,243.

FARMINGTON, a village of Dakota county, Minn., containing a flouring-mill, and shoe and carriage manufactories. It has a large wheat elevator and is located in a wheat growing region.

FARMINGTON, a village of Stafford county, N. H. It has a high school and manufactories of lumber. Population (1890), 3,064.

FARMVILLE, the county-seat of Prince Edward county, Va., on the Appomattox River, 70 miles southwest of Richmond. The tobacco trade is the principal business and the place contains tobacco factories, and a female college. Hampden-Sydney College and the Union Theological Seminary are located seven miles distant. Population, 2,404.

FARNHAM, ELIZA WOODSON (1815-64), an American philanthropist, wife of Thomas Jefferson Farnham. In 1844 she became matron of the New York State-prison at Sing Sing, and in 1848 became connected with the management of the institution for the blind at Boston. From 1849 to 1856 she was in California, and in 1859 organized a society in New York to assist destitute women to find homes in the West. Subsequently she re-

turned to California. She wrote several books about her experiences in the West.

FARNHAM, THOMAS JEFFERSON (1804-48), an American author. In 1839 he organized and took charge of a small expedition across the continent from Vermont. While in California he obtained the release of a large number of American and English citizens, who had been imprisoned by the Mexican government. He was the author of several works concerning his travels.

FARO, or PHARO, a game at cards, played chiefly by professional gamblers.

FARMERS-GENERAL (*Fr. fermiers généraux*), the name given to a privileged association in France, which flourished previous to the revolution of 1789. The members were granted the privilege of collecting the taxes on certain branches of the revenues of the nation. This system of tax-gathering became general in France from the year 1546, when Francis I let out the *gabelle* or salt-tax in this way. The privileges of the position were sold to the highest bidder; but they were largely in the hands of the king's favorites. The powers, rights, and duties of the class were defined by special decrees; but, however severe may have been the fiscal laws against fraud and contraband, it is notorious that shortly before the revolution abuses of the most flagrant description had demoralized the system and the men. During the revolution most of these obnoxious tax-gatherers perished on the scaffold, the innocent among them being oc-

asionally confounded with the guilty. About thirty farmers-general were executed in 1794. Farmers of the revenue were also an institution of ancient Rome. Tolls on roads and duties of various kinds were at one time farmed also in Great Britain.

FARMERS' ORGANIZATIONS. The earliest of the great farmers' organizations was that of the Patrons of Industry, a secret order, with ritual and "degrees of work" suggested by those of the Masonic and Odd Fellows fraternities. The scheme was devised and formulated and publicly announced Aug. 5, 1867, by William Saunders, then Superintendent of the United States Government Gardens and Conservatories in Washington, D. C. Associated with Mr. Saunders (who up to that date had not been connected with any secret society), were O. H. Kelley, J. R. Thompson, and William H. Ireland, members of the Masonic fraternity; Rev. A. B. Grosh, an influential officer of the Odd Fellows; and Rev. John Trimble, Jr., all connected with the Government departments in Washington. A week later Mr. Saunders, having occasion to visit Western New York, Ohio, and other Western States, took with him the ritual and plan of "work" under the first degree which had been formulated in Washington, and interested five others in the work. Later in the autumn the work of the 2d, 3d, and 4th degrees was formulated, and the name Patrons of Industry given to the order. On Dec. 4, 1867, at the office of Mr. Saunders, in Washington, D. C., nine persons who had taken the four degrees met and organized the National Grange, with the following officers: W. Saunders, Master; J. R. Thompson, Lecturer; A. Bartlett, Overseer; William Meier, Steward; A. S. Moss, Assistant Steward; Rev. A. B. Grosh, Chaplain; W. M. Ireland, Treasurer; O. H. Kelley, Secretary, and E. P. Ferris, Gate-Keeper. The constitution provided for the admission of women to membership, and also for the election of four ladies as officers, to be designated Ceres, Pomona, Flora, and Lady Assistant Steward. A little later a subordinate lodge of 60 members was organized, and on January, 1868, the first circulars to prominent agriculturists were sent out in all directions. The chief objects were stated to be "the promotion of unity and coöperation among the tillers of the soil and the diffusion of a higher measure of intelligence and culture." The introduction of political and religious questions into the discussions of the Grange was forbidden. April 1, 1868, Secretary Kelley resigned his clerkship in the Postoffice Department, and on a salary of \$2,000 began a tour for the establishment of subordinate granges. Seven years later there were reported about 22,000 granges, with a membership reaching up into hundreds of thousands. During the year 1888 over 200 Granges were added, a year later the membership, including men and women, was reported at over half a million; and in 1890 the subordinate granges at about 26,000. The subordinate grange is composed of persons engaged in agriculture who are over fourteen years old, and of both sexes, women being recognized as the equal of man throughout the order. The masters (and their wives) of the subordinate granges constitute the State Grange, at which the other members of the local bodies have the right to participate except in voting. The masters (and their wives) of the State Granges constitute the National Grange, at which all members may also be heard. District or county (also called Pomona) granges may be formed by the union of neighboring clubs. The local body meets one to four times a month; the district grange monthly or quarterly; and the State and National bodies annually. The Grange thus brings the farmer and his family in

close communion with his contemporaries in town, county, State, and Nation, so that all may work together when desired. The laws governing the order in essential matters originate in the National Grange, from which also emanate the charters of all local, county or State Granges. The income is from the initiation fees of \$3 for men and \$1 for women. The specific aims of the Grange are set forth in the "Declaration of Purposes," as follows:

"To create a better and higher manhood and womanhood among ourselves. To enhance the comforts and attractions of our homes, and strengthen our attachments to our pursuits. To foster mutual understanding and coöperation. To maintain inviolate our laws, and to emulate each other in labor, to hasten the good time coming. To reduce our expenses both individual and corporate. To buy less and produce more, in order to make our farms self-sustaining. To diversify our crops, and crop no more than we can cultivate. To condense the weight of our exports, selling less in the bushel and more on hoof and in fleece; less in lint, and more in warp and woof. To systematize our work, and calculate intelligently on probabilities. To discountenance the credit system, the mortgage system, the fashion system, and every other system tending to prodigality and bankruptcy.

"We propose meeting together, talking together, working together, buying together, selling together and, in general, acting together for our mutual protection and advancement as occasion may require. We shall avoid litigation as much as possible by arbitration in the Grange. We shall constantly strive to secure entire harmony, good will, vital brotherhood among ourselves, and to make our order perpetual. We shall earnestly endeavor to suppress personal, local, sectional, and national prejudices, all unhealthy rivalry, all selfish ambition. Faithful adherence to these principles will insure our mental, moral, social, and material advancement."

The first Farmers' Alliance was organized in Texas in 1873, for the purpose of coöperation against cattle thieves; but as it increased in numbers its scope was extended, and in 1880 it was chartered by the State of Texas as a benevolent institution. In 1887 it had reached a membership of over 100,000, and then united with the Farmers' Union of Louisiana, which reported a membership of 10,000; and these two bodies thus consolidated were incorporated under the laws of the District of Columbia as a national trades-union, in the name of "The National Farmers' Alliance and Coöperative Union." About the date of the Texas organization (1873), another Farmers' Alliance was organized in the State of New York, and spread westward as a non-secret order, and became a strong body north of the Ohio River and west of Pennsylvania. The National Agricultural Wheel, a league, or guild, similar in scope and aims to those of the Grange, was founded in Prairie county, Arkansas, in 1880, and soon reported numerous branches and a large membership in the Southwest.

Other important organizations are the Farmers' Mutual Benefit Association, which claims to have a half million members, mostly in the Western States; the National Farmers' League, mainly an Eastern association; the Patrons of Industry, with headquarters in Michigan and membership in that and adjacent States; the National Colored Farmers' Alliance and Coöperative Union, composed of negroes, and naturally strongest in the Southern States; the National Farmers' Alliance, which was organized in Chicago in 1880, and is composed of State Alliances in fifteen States, with societies in

others, and is familiarly termed the "North-Western Alliance," and the National Farmers' Alliance and Industrial Union. In some of the States these societies not only overlap each other, but also are heartily at work for a common object.

The National Farmers' Alliance and Industrial Union is the outcome of the union consummated in St. Louis, Mo., Oct. 1, 1889, between the National Farmers' Alliance and Cooperative Union and the National Agricultural Wheel, and the new name was given to the united societies at the annual meeting held in that place on that date. The new society thus created was then credited with a total membership estimated at from 1,600,000 to 2,500,000.

THE NATIONAL FARMERS' POLITICAL LEAGUE is a non-secret, independent, non-partisan organization, in harmony with the Alliance, Farmers' Union, Grange, and kindred associations, agricultural societies, farmers' clubs, and similar organizations. But the League goes a step further. Its object is to be "the farmers' political welfare. The work of the League is directed toward securing a just representation and treatment of the agricultural interests in Congress and in the Legislatures, and due recognition of farmers in all public affairs, without conflicting with the best interests of the entire people." It consists of a National League and of State leagues, with county and town leagues. The National League has general supervision of the affairs of the Farmers' League and the work of organization, and attends specially to the farmers' interests in Congress. The State leagues, as soon as organized, push the work of organization in their respective States, and attend to the farmers' special interests in the Legislature. The County League attends to the farmers' interests in county matters, and to affairs in Senatorial and Representative districts. The town leagues furnish the delegates who constitute the county leagues and attend to the farmers' interests in local districts, and in each election precinct.

The next annual meeting of the National Farmers' Alliance and Industrial Union was held in Ocala, Ga., during the first week in December, 1890. It was composed of 136 delegates from 35 States and Territories. After extended discussion it adopted the following resolutions:

First—We demand the abolition of national banks. We demand that the Government shall establish sub-treasuries or depositories in the several States which shall loan money direct to the people at a low rate of interest, not to exceed two per cent, per annum on non-perishable farm products, and also upon real estate with proper limitations upon the quantity of land and amount of money. We demand that the amount of the circulating medium be speedily increased to not less than \$50 per capita.

Second—We demand that Congress shall pass such laws as shall effectually prevent the dealing in future on all agricultural and mechanical productions; preserving a stringent system of procedure in trials such as shall secure the prompt conviction and the imposition of such penalties as shall secure the most perfect compliance with the law.

Third—We condemn the Silver bill recently passed by Congress, and demand in lieu thereof the free and unlimited coinage of silver.

Fourth—We demand the passage of laws prohibiting alien ownership of land, and that Congress take prompt action to devise some plan to obtain all lands now owned by aliens and foreign syndicates, and that all lands now held by railroads and other corporations in excess of such as is a tually used and needed by them be reclaimed by the government and held for actual settlers only.

Fifth—Believing in the doctrine of equal rights to all and special privileges to none, we demand that our national legislation shall be so framed in the future as not to build up one industry at the expense of another, and we further demand a removal of the existing heavy tariff tax from the necessities of life that the poor of our land must have. We

further demand a just and equitable system of graduated tax on incomes. We believe that the money of the country should be kept, as much as possible, in the hands of the people; and hence, we demand that all National and State revenues shall be limited to the necessary expenses of the Government economically, and honestly administered.

Sixth—We demand the most rigid, honest, and just State and National governmental control and supervision of the means of public communication and transportation; and if this control and supervision does not remove the abuses now existing, we demand Government ownership of such means of communication and transportation.

The officers elected for the ensuing year were as follows: President, L. L. Polk, of North Carolina; Vice-President, B. F. Clover, of Kansas; Secretary, J. H. Turner, of Georgia; National Lecturer, J. S. Willetts, of Kansas; Chairman Executive Committee, C. W. Macune, of Texas.

At the annual meeting in Ocala, articles of union were adopted by which the Farmers' Mutual Benefit Society, embracing a membership of about 500,000 members in Illinois, Indiana, Iowa and adjacent States, was to be merged in the National Farmers' Alliance and Industrial Union. The Colored Farmers' Alliance, claiming a membership of about 1,200,000, under the superintendency of Col. R. M. Humphrey, a white man, and formerly a preacher in Texas, was also represented at the Ocala meeting, and a basis of union with the National Farmers' Alliance was agreed to, to go into effect a year hence. The agreement embraced the following provisions, which were to apply also to the Farmers' Mutual Benefit Association:

"We recommend the selection of five men from each national body, two of whom shall be the president and secretary, who shall, with a similar committee from other labor organizations, form a supreme executive board, who shall meet as often as may be deemed necessary upon the joint call of a majority. The presidents of the bodies joining this confederation shall be empowered to do such things for the mutual benefit of the various orders as shall be deemed expedient, and shall, when officially promulgated through the national officers, be binding upon such bodies until reversed by the action of the national assemblies themselves in matters political, educational, and commercial; and we hereby pledge ourselves to stand faithfully by each other in the great battle for the enfranchisement of the laborer from the control of corporate and political rings.

"Each order is to bear its own members' expenses to the Supreme Council, and be entitled to as many votes as it has legal voters. We commend and urge that equal facilities, educational, commercial, and political, be demanded for colored and white Alliance men alike, competency considered, and that a free ballot and a fair count be insisted upon and had for colored and white alike by every true Alliance man in America.

"We further recommend that the plan of district alliances conforming to Congressional district lines be adopted by every order, and that the lecturers and officers of said districts and counties cooperate with each other in educational, commercial, and political matters."

One of the most remarkable features of the meeting at Ocala was the development of feeling in favor of an independent political party movement—a movement which would be likely to engage the attention and sympathy of all the various farmers' organizations, and at the same time be sufficiently unrestricted in its membership to open its doors to such "honest persons" as are shut out from membership in most, if not all, the other farmers' societies. There was already at hand an organization which seemed adapted to meet the want indicated. Nearly a year previous the *Citizens' Alliance* was started in Kansas, and had already a large membership in that State, and in Nebraska and Iowa. A national organization was perfected at Ocala, and the following officers were chosen: President, J. D. Holden, of Kansas; secretary, Ralph Beaumont, of New York; treasurer, L. P. Wild, of Washington, D. C.

The annual salaries of the officers of the national organization are fixed by the statutory laws as follows: President, \$3,000, office and traveling expen-

ses, and \$900 for stenographer; secretary, \$2,000 and office expenses; treasurer, \$500; lecturer, \$2,000 and actual traveling expenses; members of the executive committee, \$500 each and traveling expenses when in actual service, except that the chairman shall have \$2,000. A per capita tax of five per cent. on members must be paid into the national treasury annually to defray expenses.

The declaration of principles stated that "the organization is formed for the purpose of cooperating with the Farmers' Alliance, the Knights of Labor, and other orders, in the support of the St. Louis platform (which embraced largely the same items adopted at Ocala) 'and to this end the organization is political in its nature.'" The officers included those mentioned and an executive committee of one from each State and Territory, with headquarters in Washington, D. C. Charters were to be furnished to subordinate bodies on application of five or more citizens. Local organizations were to judge of the qualification of their members. It was declared that the present national organization is temporary, and that as soon as the order is organized in a majority of the States, a national convention shall be held to revise it. Subsequently the following call was issued at Ocala:

Whereas, In unity there is strength; therefore, it is desirable that there should be a union of all the variously named organizations that stand on common ground.

To this end the individuals from various States, whose names are hereto signed, make this call for a National Conference, to be composed of delegates from the following organizations, namely:

The Independent Party, the People's Party, the Union Labor Party, the late Federal and Confederate soldiers, the Farmers' Alliance, the Farmers' Mutual Benefit Association, the Citizen's Alliance, the Knights of Labor, the Colored Farmers' Alliance, and all other industrial organizations that support the principles of the St. Louis agreement of December, 1889. Each State organization to send one delegate from each Congress district, and two from the State at large; and each district organization to send not less than three delegates, and each county organization not less than one delegate to be chosen according to the custom of each respective organization during the month of January, 1891; also that the editor of each newspaper is hereby invited as a delegate that has advocated the principles of the St. Louis agreement and supported the candidates nominated thereon in 1890.

This confederation of parties met in its first annual convention as the People's Party at Omaha, July 2, 1892. On the 4th of July it adopted a platform in which it declared for a union of labor forces, free coinage of silver, increase of the circulating medium, a graduated income tax, government ownership of the telegraph and telephone, reclamation of lands from aliens, the eight-hour law, limitation of the office of president to one term, and opposition to all subsidies to private corporations; its candidates were Gen. James B. Weaver, of Iowa, for president and Gen. James Field, of Virginia, for vice-president. A fusion with other parties was made in some of the States. The People's Party received 1,055,424 popular and 22 electoral votes.

FARQUIER WHITE SULPHUR SPRINGS, in Farquier county, Va., fifty-six miles southwest of Washington, D. C. The place is delightfully situated, and the waters are of much value in certain chronic diseases. The buildings were mostly destroyed during the war.

FARR, WILLIAM, English medical statistician, born at Kenley, Shropshire, Nov. 30, 1807, died in 1883. He studied medicine at the Universities of Paris and London, graduating from University College in 1833, and devoted himself to the study of vital statistics. Through his efforts great improvement was made in the collection of data for that department, the registration of all the deaths in England and their causes was begun, and Dr.

Farr was given a position in the register's office. He was assistant census commissioner of Great Britain from 1851 to 1881, in 1855 was elected Fellow of the Royal Society, and in 1859 received from the University of Oxford the degree of D. C. L. He was a frequent contributor to the *British Annals of Medicine*; and his paper on *The Construction of Life Tables* (1859), his introduction to the *English Life Tables* (1864), and *Statistical Nosology* are of great value.

FARRAR, FREDERICK WILLIAM, D. D., F. R. S., archdeacon of Westminster, born at Bombay, India, Aug. 7, 1831, and educated at Cambridge, where he graduated with the highest classical honors in 1854, and became a Fellow of Trinity College. In 1857 he received the degree of M. A., and was ordained. After some years spent as assistant master at Harrow, he became head master of Marlborough School. In 1873 he was made chaplain in ordinary to the queen, in 1876 canon of Westminster and rector of St. Margaret's, and in 1883 archdeacon of Westminster and rural dean. Canon Farrar is an eloquent preacher and writer, his chief works being *Life of Christ* (1874), *Life of St. Paul* (1879), *The Early Days of Christianity* (1881), *Every-Day Christian Life, or Sermons by the Way* (1887), *Lives of the Fathers* (1888), *Sketches of Church History* (1889). He is also an earnest temperance reformer. He was appointed chaplain of the House of Commons in 1890.

FARRAR, HENRY, an American artist, born in 1843. He first gained distinction for his water-color, and afterwards became noted as a landscape painter. He is a member of various art societies.

FARWELL, CHARLES BENJAMIN, a U. S. Senator from Illinois, born in 1823. He held the office of county clerk of Cook county, Ill., in which county Chicago is situated, eight years, 1853-61; was elected to Congress in 1870 over John Wentworth, and was reelected in 1872 and 1874, after which he declined reelection; was a candidate again in 1880, and was elected, declined further election; was elected to the United States Senate in 1887, to fill a vacancy occasioned by the death of General John A. Logan. His term of service expired March 3, 1891.

FASCES, bundles of rods, usually made of birch, but sometimes of elm, with an axe projecting from the middle of them, which were carried before the chief magistrates of ancient Rome as symbols of their power over life and limb. They were borne by lictors, at first before kings, in the time of the Republic before consuls and prætors, and afterwards before emperors.

FASCIA: in anatomy, a tissue of strong fibrous character, spread out in a layer, which surrounds some muscle or any other special tissue or organ of the body and binds it in place. There are two kinds of fascia, the superficial or subcutaneous and the deep. The superficial fascia is thin and light, and covers the body beneath the skin. The deep fascia are composed of unyielding fibrous substance, which invests the muscles. Fascia are condensed layers of the general connective tissue of the body.

FASCINES, fagots for military purposes made of young branches of trees or brush wood. They are used in the construction of temporary works, for filling a ditch, and sometimes in a pile for setting fire to an obstruction.

FAST AND LOOSE is the name of a game which was much practiced by the gypsies in the time of Shakespeare. The phrase is now often used to designate the conduct of those numerous slippery characters whose code of ethics does not forbid them to say one thing and do another.

FATALISM, the doctrine that all things are subject to fate, or that they take place by inevitable necessity.

FATA MORGANA, a striking kind of mirage observed in the Strait of Messina. A spectator on the shore sees images of men, houses, ships, etc., sometimes in the water, sometimes in the air; the same object having frequently two images, one inverted.

FATHER-LASHER (*Cottus bubalis*), a fish armed with very strong spines on the back of the head and gill-covers. When touched it distends its gill-covers, sets out its spine, and assumes a very threatening appearance. It is brown above, whitish beneath, curiously marbled and spotted. It is said to be a wholesome and agreeable food. In Scotland it is called the *Lucky Proach*.

FATHOM, a measure of six feet, principally used in references to marine soundings and in mines. Originally a fathom was taken as the width to which the two outstretched arms extended.

FATTY DEGENERATION, in pathology, a condition of the animal system, in which the minute structural elements of living organisms are gradually replaced by fat-globules.

FAUCIT, HELEN, an actress, born in 1816, who gained renown on the English stage as Julia, in *The Hunchback*. She was one of Macready's company in his revival of Shakespeare.

FAUGÈRE, ARMAND PROSPER, a French littérateur, born at Bergerac, Dordogne, Feb. 10, 1810, died in 1888. He was for some time employed in the department of public instruction, and subsequently became director of the archives, in the bureau of foreign affairs. He published *Éloge de Blaise Pascal* (1842); *Pensées, Fragments et Lettres de Blaise Pascal*, restored to their original form (1844); *Mémoires de Madame Roland* (1864); and *Fragments de Littérature Morale et Politique* (1865).

FAULKNER, CHARLES JAMES, a U. S. Senator from West Virginia, born in 1847. He accompanied his father, who was minister to France in 1859; attended noted schools in Paris and Switzerland, returned to the United States in 1861, and immediately went south; in 1862, at the age of fifteen, he entered the Virginia Military Institute at Lexington; served with the cadets in the battle of Newmarket; served as aid to Gen. J. C. Breckinridge, and afterwards to Gen. Henry A. Wise, surrendering with him at Appomattox. On his return to Boydville, his home in Martinsburgh, he studied under the direction of his father until October, 1866, when he entered the University of Virginia, graduating in 1868; was admitted to the bar in September of the same year; was made grand-master of the Masonic Grand Lodge in 1879; in 1880 was elected judge of the Thirteenth Judicial Circuit, composed of the counties of Jefferson, Morgan and Berkeley; was elected to the United States Senate as a Democrat, to succeed Johnson N. Camden, in 1887. His term of service expired March, 1893.

FAULKNER'S ISLAND, a small islet in Long Island Sound, off the entrance to the harbor of Guilford, Conn. It has a flashing light with a fog-bell.

FAUNA, a term employed to designate animals collectively, or those of a particular geological period, or those of a particular country, as the fauna of America. The term bears the same relation to the animal kingdom that flora does to the vegetable. Its derivation is from the mythological fauns regarded as the patrons of wild animals. In the fauns of a country are included only those animals which are indigenous to it, and not those which have been introduced.

FAURE, JEAN BAPTISTE, born in 1830, a French baritone of great excellence and reputation; he went on the stage in 1852, and in 1857 became professor at the Paris Conservatoire.

FAUSSE-BRAYE: in fortification, a name given by French engineers to a small mound of earth cast about a rampart. This work has been mostly discarded by modern engineers. The *fausse-braye* had the advantage of giving an additional tier of guns for defensive purposes.

FAUSTINUS I, Emperor of Hayti, born in St. Domingo in 1789, died in 1867. He was originally a negro of very humble circumstances. In the year 1844, when the Haytian Republic was dissolved, a struggle for the supreme power ensued, in which Faustinus played an important part. In 1847 he was appointed president of the Republic. On April 16, 1848, a dreadful massacre of the mulattoes in Port-au-Prince took place at his instigation. This and similar measures struck terror into the hearts of his opponents. In August, 1849, he had himself proclaimed Emperor of Hayti, a title which he enjoyed for about ten years; but a revolution having broken out in 1858, and a Republic having been declared, he was forced to abdicate in 1859.

FAUVETTE, a French name applied to the little song birds of the family *Sylviadæ*, or warblers, having straight slender bills slightly compressed in front, the ridge of the upper mandible curving a little towards the tip, and the legs short. They mostly belong to the genus *Curruca* as the white-throat, or garden warbler, etc., and to the genus *Salicaria*.

FAVIGNANA, the chief of the *Ægades*, a group of islands in the Mediterranean, off the west coast of Sicily. It is six miles in length, and about two miles in breadth, and lies at a distance of six miles from the Sicilian shore.

FAVOSITES, a genus of lamelliferous corals, found in Silurian, Devonian, and Carboniferous strata. They are corals, closely packed together, no space being left between the walls of the different corallites. As in the other Palæozoic corals, the lamellæ are developed in multiples of four, and the older portion of the stony base is partitioned off by horizontal tabulæ.

FAVRE, JULES CLAUDE GABRIEL, a French statesman, born in Lyons, March 21, 1809, died at Versailles, Jan. 20, 1880. He became a prominent lawyer and liberalist in Paris; was for a time secretary-general of the interior in the Republican ministry of 1848; strongly opposed Louis Napoleon during the presidency of the latter, and still more decidedly under the second empire opposed the measures which brought on the Franco-German war, but after its commencement supported the national cause. After the fall of Sedan he became vice-president and minister of foreign affairs in the new Republic, and took an important part in the negotiations preceding the treaty of peace with Germany. He retired from the ministry in July, 1871, and devoted himself to law and literature. In 1876 he was returned as Senator for the department of the Rhone. He was a brilliant orator, and the excellence of his literary productions won him a place in the Academy. He was author of *Rome et la République Française* (1871), and *Le Gouvernement du 4 Septembre* (1871-72).

FAWCETT, HENRY, an English political economist and author, born at Salisbury in 1833, died Nov. 5, 1884. He graduated with honors at Trinity Hall, Cambridge, in 1856, and became a fellow of his hall. Although deprived of his sight by an accident in 1858, he determined to pursue the course which he had previously chosen. In 1863 he became

professor of political economy in the University of Cambridge. Elected to Parliament for Brighton in 1865-74 he was in the latter year returned for Hackney, and in 1880 was made postmaster-general. He was an advanced liberal in politics, advocating election by ballot and woman suffrage. He was author of *A Manual of Political Economy* (1863); *The Economic Position of the British Laborer* (1865); *Pauperism* (1871); a volume of *Speeches* (1873), and *Free Trade and Protection* (1878).

FAWCETT, PHILIPPA GARRETT, daughter of the late Prof. Fawcett, M. P., postmaster-general, born at Cambridge, England, in 1868. She was educated at Clapham High School, at University College, and in 1887 went to Newnham, Cambridge, with a scholarship. At her graduation in 1890 she was placed in the Tripos lists "above the senior wrangler," thus achieving an extraordinary success. The achievement was peculiarly appropriate to the daughter of Prof. Fawcett, who had so zealously advocated the higher education of women.

FAY, JONAS, M. D., born in Massachusetts, in 1737, died in 1818. He was a surgeon in the French and Indian war, and was with Ethan Allen at Ticonderoga. He became a member of the State Council of Vermont after assisting to make it a separate State. He was also judge of the superior court, and agent of the State in Congress.

FAY, THEODORE SEDGWICK, an American author, born in 1807. In 1828 he became associate editor of the New York "Mirror." From 1837 to 1853 he was secretary of the American legation in Berlin, Germany, and from 1853 to 1861 was minister resident in Bern, Switzerland. He afterward lived in retirement in Berlin. His works cover a wide range of topics.

FAYE, HERVÉ AUGUSTE ÉTIENNE ALBANS, a French astronomer, born at St. Benoit, Indre, Oct. 5, 1814, studied astronomy with Arago, and in 1843 discovered the comet which bears his name. He was elected a member of the Academy of Sciences in 1847, became professor of geodesy at the École Polytechnique in 1848, and in 1854 was made rector of the Academy at Nancy. In 1873 he became inspector-general of scientific instruction, and in 1878 was appointed director of the Paris Observatory. He has published a number of astronomical treatises.

FAYERWEATHER, DANIEL B. (1821-90), an American philanthropist. At an early age he learned the trade of a shoemaker, and at thirty-four became a member of a firm of leather dealers in New York city. That move was the beginning of his success, and at the time of his death he represented the largest hide and leather business in New York, if not of the world. He left an estate estimated at \$6,000,000, of which \$2,195,000 were given to various institutions of learning and charity.

FAYETTE, the county-seat of Howard county, Mo., 12 miles from the Missouri River. It contains a female seminary and Central College.

FAYETTEVILLE, the county-seat of Washington county, Ark., and a delightful summer resort in the Ozark Mountains. It has manufactories of evaporated fruit, flour, and wagons. It has good public schools, contains the Arkansas Industrial University, and has a population of 2,942.

FAYETTEVILLE, a village of Onondaga county, N. Y., 10 miles east of Syracuse. It has flour and paper mills, and manufactures pearl barley, hydraulic cement, quick-lime. Population, 1,410.

FAYETTEVILLE, the county-seat of Lincoln county, Tenn. It has manufactories of woolen goods, broadcloths, cassimeres, carriages, and is a shipping point for corn and cotton. Pop., 2,410.

FAYRER, SIR JOSEPH, an English physician, born at Plymouth, Dec. 6, 1824. He received the degree of M. D. at Edinburgh and at the University of Rome, entered the East India Company's service in 1850 and served in the Burmese war of 1852, and during the mutiny of 1857. In 1859 he was appointed professor in the Calcutta Medical College, and in 1874 surgeon-general and president of the medical board of the India office. Among his writings are: *Poisonous Snakes of India*; *Tropical Diseases*; *Clinical Surgery in India*; *European Child-Life in Bengal*, and a number of professional works relating to questions of climate, etc.

FAZY, JEAN JAMES, Swiss statesman, born at Geneva, May 17, 1794, died there Nov. 6, 1878. He was educated at a Moravian school at Neuwied, studied law and settled in Paris. Here he took an active part in the opposition to the restoration, and when it became apparent that a republic could not be established in France he returned to his native city, where he became a leader in the radical Republican party. In 1846, when the party secured a change of the constitution, Fazy became head of the government, and during the fifteen years that the party continued in power exerted great influence at Geneva. He retired from public life in 1865.

FEATHERFOIL, WATER-FEATHER, or WATER-VIOLET, a species of *Hottonia*, so called from the finely divided leaves. The best known species are *H. inflata* of the United States and the European species *H. palustris*. They are curious primulaceous plants, which grow submerged in water, and thrust up long scapes above the surface to produce the blossoms.

FEATHER-GRASS, a genus of grasses remarkable for the long awns which give a graceful appearance to the species. It is a perennial plant and easy of cultivation; a native of the South of Europe.

FEATHER RIVER, California, a feeder of the Sacramento. It rises in two forks in the Sierra Nevada, and has a southerly course of about 250 miles. It is navigable for steamboats to Marysville, and large quantities of gold have been found on its banks.

FEBRICULA, a fever of short duration and mild character, having no distinct type or specific symptoms by which it can be distinguished or described.

FEBRIFUGE, medicines calculated to dispel or cut short fever.

FEBRONIANISM, a system of doctrine antagonistic to the admitted claims of the Roman pontiff, and asserting the independence of national churches propounded in 1763 by Johann Nikolaus von Hontheim, writing under the pseudonym of "Justinus Febronius."

FEBRUUS, the name of an old Italian divinity, whose worship was celebrated with lustrations during the month of February. The ceremonies instituted in his honor were believed to have the effect of producing fertility in man and beast. He was supposed to be the god of the lower world, and was worshipped as such by the Romans, and identified with the Greek Pluto.

FECHNER, GUSTAV THEODOR, a German naturalist, born at Gross-Särchen in Lower Lusatia, April 19, 1801, died Nov. 18, 1887. After studying at Leipzig University, he became professor of physics there in 1834, but was obliged to resign the position five years later on account of a disease of the eyes. He subsequently turned his attention to æsthetics and anthropology. His writings include *Ueber das höchste Gut* (1842), *Elemente der Psychophysik* (1860), *Ueber die Seelenfrage* (1861), and *Vorlesung der Ästhetik* (1876).

FECHTER, CHARLES ALBERT (1824-79), an actor, born in London and educated in France. He made his *début* in 1840 at the Salle Molière, Paris, in a piece called *Le Mari de la Veuve*. Later he appeared in the principal cities of Italy, Germany and England. In 1869 he came to the United States, and after a tour through the States returned to Europe, but again visited the United States in 1872, where he remained until his death, which occurred at his farm in Pennsylvania in 1879.

FECILA, or FÆCULA, a term applied to a starch obtained from various sources, but in France the term is generally restricted to the starch of the potato.

FEDERALIST, a collected series of articles, originally published in "The Independent Journal" 1787-88, written by Alexander Hamilton, James Madison and John Jay, for the purpose of leading the States at large, especially New York, to see the advantages of the proposed Constitution and the insufficiency of the existing confederacy. The basis of its argument is utility; and it shows clearly not only the ideas of the framers of the Constitution, but also the cardinal differences of the parties which have contended in American politics.

FEDERALSBURG, a village of Caroline county, Md., on Nanticoke River in the center of the great Peach Peninsula. Fruit-raising and the making of fruit-baskets are the chief occupations.

FEELAN, PATRICK A., Roman Catholic prelate, born in Tipperary, Ireland, in 1829, was educated at Maynooth, and came to the United States in 1852. He became president of a seminary at Carondelet, held a pastorate in St. Louis, and in 1865 was consecrated bishop of Nashville. In 1880 he became the first archbishop of Chicago.

FEIA, a large lake of Brazil, 130 miles northeast of Rio Janeiro, near the Atlantic, with which it communicates by an artificial canal called Furado.

FEINT: in naval or military matters, a mock assault or attack, usually made to throw an enemy off his guard against some real design upon his position.

FEITH, RHIJNVIS, a Dutch poet, born Feb. 7, 1753, at Zwolle, in Overijssel, died Feb. 8, 1824. He studied law, and in 1780 became mayor of his native place. Feith tried almost all kinds of poetry. In 1792 appeared *Het Graf* ("the Tomb"), a didactic though sentimental poem; in 1802, *De Ouderdom* ("Old Age"); in 1796-1810 four volumes of lyrical pieces, marked by a high enthusiasm and warmth of feeling. Of his tragedies the best known are *Thirza*, *Johanna Gray*, and *Inez de Castro*.

FELANICHE, or FELANITX, a town on the island of Majorca. On a neighboring hill is an ancient Moorish castle, with subterranean vaults. Population, 5,918.

FELDMANN, LEOPOLD, a German writer of comedies, born at Munich in 1803. He was apprenticed to a cobbler in 1815, and soon giving evidence of his determination to be a poet, his master sent him back to school, where in 1817 he wrote a play, *Der falsche Eid* (The False Oath), which was produced on the stage. After a few years of business he devoted himself entirely to literature. His first comedy, *Der Sohn auf Reisen* (The Son on His Travels), was acted at Munich with applause. His works are numerous, and reckoned among the best specimens of modern German comedy. In 1852 he published a collection of his comedies in six volumes.

FELDSPAR, or FELSPAR, a family of minerals which crystallize in several systems, and enter largely into the composition of all granitic and

many metamorphic rocks, and in decomposition are the source of clay.

FELICITAS, SAINT, a Roman matron martyred with her seven sons 164 A. D. under Marcus Aurelius. A woman of the same name suffered death with Saint Perpetua, A. D. 211, for refusing to offer sacrifices to idols.

FELIXIANS, a Spanish sect of the latter part of the eighth century, so called from Felix, Bishop of Urgel.

FELIPILLO, Peruvian Indian, born in Poeches in 1508; died in 1535. In 1527 Francisco Pizarro desired the Peruvians to give him two of their youths to be sent to Spain for an education, one of whom was Felipillo. In 1531 he returned with Pizarro to Peru, where as an interpreter he made himself useful to the Spaniards and their commanders. In 1532 he and Hernando de Soto were sent to treat with the Peruvian monarch, Atahualpa. On this mission Felipillo was smitten with one of the Inca's wives, and to further his purposes he gave such incorrect translations of the Inca's replies as to render the Spaniards suspicious of treachery. In September, 1535, when Almazro was on his way to invade Chili, Felipillo was his interpreter. During the march of the Spaniards he fled from the army, probably for the purpose of betrayal, was taken prisoner and strangled by the general's order. Before his death Felipillo confessed.

FELTON, CHARLES N., a United States Senator, Republican, from California; a business man, born in Erie county, N. Y., in 1832; received a common-school and academical education, and served six years as assistant treasurer and treasurer of the United States mint at San Francisco; was elected to the 49th and 50th Congresses. In 1891 he was elected by the California legislature to the United States Senate to succeed George Hearst, deceased.

FELTON, CORNELIUS C., LL. D., born in Massachusetts in 1807, died in Pennsylvania in 1862, a famous Greek and Latin scholar, who in 1860 was president of Harvard University. He was regent of Smithsonian Institution, and author of numerous publications.

FELUCCA, a vessel used in the Mediterranean. It is propelled by oars, from 16 to 24, and is rigged with two lateen sails. It has frequently a rudder at each end, to be applied as occasion demands. During the French war feluccas were armed with a heavy gun or two, and sent out as gun-boats against the English ships.

FEME COVERTE (*femina viro cōperta*): in the law of England, a married woman; a woman under cover, authority or protection.

FEMERN, or FEHMARN, an island in the Baltic belonging to the Prussian province of Sleswick-Holstein. It has an area of 71 square miles; is flat, fertile, and well cultivated, but has an unhealthy climate. Agriculture, fishing and stocking-weaving form the principal employments of the inhabitants. Population, 9,800.

FEHMGERICHTE, spoken of as the Holy Feme (or Fehme), and also known as the Westphalian or Secret Tribunals, were among the most remarkable phenomena of the Middle Ages, and supplied the place of the regular administration of justice, then in a deplorable condition. The origin of these courts has been ascribed to Charlemagne. In the general confusion which prevailed in Germany, when all laws, both civil and ecclesiastical, had lost their authority, the Fehmgerichte were organized for the purpose of arresting and controlling the incipient anarchy that threatened to bring chaos back again, and of inspiring with salutary terror, through the agency of their mysterious powers and solemn judgments, all rapacious and

lawless persons who, on account of the impotence of the ordinary legal checks, committed crime with impunity. The members of the Feme were called *Wissende*, "the knowing one," or the *initiated*. It was necessary that they should be born in wedlock, and be of the Christian religion. The sittings of the tribunal were either open or secret. The persons convicted, as well as those who refused to obey the summons, were given over to the Freischöffen. The first Freischöffe who met him was bound to hang him on a tree, or, if he made any resistance, to put him otherwise to death. A knife was left beside the corpse to show that it was not a murder, but a punishment inflicted by one of the Freischöffen.

FENCES, LAW OF. At one time landowners were by common law under no obligation to fence in their property; trespass was to be prevented by a duty imposed upon each owner of animals to keep them within his own estate, and a liability for all damages they might inflict upon his neighbor. At present, however, the matter of fence-building is regulated to some extent by statute. The duties imposed upon railroad companies to maintain fences along the line of their routes are particularly minute and exacting.

FENCIBLE, a word meaning defensive, and formerly applied to regiments raised for local defense, or at and only for a special crisis.

FÉNELON FALLS, a village in Victoria county, Ontario, between Cameron and Sturgeon Lakes, 16 miles north of Lindsay. It has a waterfall 20 feet high, 300 feet wide, and large lumber mills.

FENESTELLA, or **FENESTRELLA**, a genus of polyp, resembling the "lace coral," very common in Palæozoic rocks, ranging from the Lower Silurian to the Permian. Thirty species have been described.

FENNEC, or **ZERDA**, a species of *Canis*, native of Africa, resembling foxes in general form and in the bushy tail. The species are small, and have remarkably large ears and blue eyes.

FENTON, a village of Genesee county, Mich., 50 miles northwest of Detroit. It contains a flour mill, foundry, woolen factory, a cooperage, Baptist seminary, and a population of 2,182.

FENTON, REUBEN EATON (1819-85), an American statesman. He began the practice of law in Jamestown, N. Y., in 1841, and in 1848-51 was supervisor of the town of Carroll. In 1852 he was elected to Congress as a Democrat, but was defeated two years later. In 1856 he was elected again, however, and served from 1857 to 1864, when he resigned to become governor of his State. He received a gubernatorial reelection, and from 1869 to 1875 was a U. S. Senator.

FENWICK'S ISLAND, off the east coast of Worcester county, Md., 20 miles south of Cape Henlopen, in lat. 38° 27' 1" N., long. 75° 2' 59" W. It has a light-house 86 feet high.

FENYES, ELEK, a Hungarian geographer and statistical author, born in Csokaj, in the county of Bihar in 1807. He traveled over the country, and thoroughly acquainted himself with the state of the Hungarian kingdom, of which there had never before been an authentic survey. The first fruits of his enterprise appeared in 1840, under the title *Hungary and Its Annexed Parts, Geographically and Statistically Considered*. He was awarded the great prize of 200 ducats by the Hungarian Academy. All of his works are written in the Magyar tongue; some of them have been translated into German, and repeatedly published.

FERÆ: in the Linnæan system of zoölogy, an order of Mammalia, nearly corresponding to the Carnaria of Cuvier.

FERÆ NATURÆ, the term given in Roman law to those animals which flee the dominion of man, whether beast, bird, or fish, and retain their natural freedom. They were the property of any one who might catch them.

FER DE LANCE, the lance-headed or yellow viper, *Craspedocephalus lanceolatus*, a very venomous serpent of the West Indies and South America. It is from five to eight feet long, is capable of making considerable springs, and gives no warning of its attack. Its bite is very often fatal, and it is dreaded alike by man and beast.

FERGUS FALLS, a city and county-seat of Otter Tail county, Minn. It has good water-power, flour and paper mills. Population (1890), 3,772.

FERGUSON, SIR SAMUEL, poet and Celtic scholar, born at Belfast, Ireland, in 1810, died in 1886. He was educated at Trinity College, Dublin, called to the bar in 1838, and in 1859 was made queen's counsel. He gave much attention to Irish antiquities, and as president of the Royal Irish Academy gave a powerful impetus to the scientific study of early Irish art. His contributions to the magazines began to attract attention about 1832. He published *Lays of the Western Gael* (1865); *Congal, a Poem in Five Books* (1872); *Poems* (1880); and *The Forging of the Anchor* (1883). He was knighted in 1878.

FERGUSON, JAMES, D. C. L., F. R. S., a Scottish architect, born at Ayr in 1808, died Jan. 9, 1886. He was educated at the high school of Edinburgh, and after spending some years as an indigo-planter in Bengal engaged in extensive explorations of India, sketching and studying the rock-temples. In 1859 he was appointed a member of a royal commission on the defenses of Great Britain. His later works include *The Palaces of Nineveh and Persepolis Restored* (1851), *Hand-book of Architecture* (1855), *Tree and Serpent Worship* (1869), *History of Rude Stone Monuments* (1872). The chief features of his earlier works were embodied in *Cave Temples of India* (1880).

FERLAND, JEAN ANTON BAPTISTE (1805-65), a Canadian clergyman. He was ordained priest in 1828, and the same year named vicar of Quebec. In 1841 he became professor in the seminary of Nicolet, and seven years later was elected superior. In 1850 he became a member of the arch-bishop's privy council. In 1855 he was made chaplain of the military hospitals of Quebec, and the same year professor of Laval University. In 1864 he was elected dean of the faculty of arts in that university. He was the author of several books relating to Canada.

FERMATA: in music, the name given to a pause or resting-point, generally marked by the sign ♯. The notes over which this sign is placed are prolonged beyond their true length. It is frequently found near the end of a part of a composition, which affords an opportunity for the singer or player to introduce an extempore embellishment.

FERN, MALE, *Aspidium* (*Nephrodium*) *filix-mas*, a name given by old herbalists in contrast to the Lady Fern, *Asplenium* (*Lastrea*) *filix-femina*, which, from the aspect of their foliage and common association in woods, are imagined to represent the two sexes. The large subterranean rhizome contains a volatile oil, to which the long-established medicinal value as a vermifuge (particularly in tapeworm) is due.

FERNANDINA, a port of entry in northern Florida, and county-seat of Nassau county, on the west side of Amelia's Island, between Prince William and Nassau Sounds, Amelia River and the Atlantic. It affords good anchorage, has a light-house, large foreign and coast trade in cotton and

naval stores, has manufactories for creosoting lumber and piling, and for making superior plastering fiber from raw palmetto. The city has a steamboat line to New York. Population, 2,803.

FERNS. See *Britannica*, vol. IX, p. 100.

FERN, SWEET, a shrub of the natural order *Amentaceæ*, sub-order *Myricææ*, a native of the mountain woods of North America, forming a small bush with linear pinnatifid, fern-like leaves. Its leaves have a powerful aromatic fragrance when rubbed. It is tonic and astringent, and much used in the United States as a domestic remedy for diarrhoea.

FER OLIGISTE: in mineralogy, a term applied to a variety of anhydrous red oxide of iron, otherwise called *Specular Iron Ore*. The famous Swedish, Russian and Elba iron are in greater part prepared from this iron ore. Specular iron ore is found mostly confined to crystalline or metamorphic rocks.

FERONIA, an Italian goddess, especially honored among the Sabines. Little is known concerning the myth, and she has been variously regarded by commentators as goddess of commerce, of liberty, and as the goddess who presided over the woods and groves.

FEROZABAD, or FIROZABAD, a town of British India, 24 miles east of Agra. It is surrounded by a wall, outside of which are many mounds and interesting ruins. Population, 16,023.

FEROZESHAHR, a village within the district of Ferozepore. It claims notice mainly as the scene of the second in order of the four great battles of the first Sikh war. See *Britannica*, vol. XX, p. 112.

FERRANDINA, a town in the south of Italy, in the province of Basilicata, on a height on the right bank of the Basento, 35 miles southeast of Potenza. It produces an excellent wine. Population, 7,086.

FERREIRA, ALEXANDRE RODRIGUES, born in Bahia, April 27, 1756; died in Lisbon, Portugal, April 23, 1815. He studied at Coimbra, and in 1770 became professor of natural history in that university. In 1778 the government of Portugal appointed him to make researches into the natural history and geography of the country bordering the Amazon river, but it was not until 1783 that he was enabled to engage in the Brazilian exploration. In 1792 the explorer returned to Belem, and a year later went to Lisbon. In Portugal he became connected with the ministry of marine, and in 1796 was made superintendent of the royal cabinet of natural history and of the botanical gardens.

FERRIER, DAVID, a Scotch physician, was born in Aberdeen in 1843. He was educated in Aberdeen and studied medicine in Heidelberg and Edinburgh. In 1872 he became professor of forensic medicine at King's College, London. His *Functions of the Brain* was published in 1876, and *Localization of Cerebral Disease* in 1878. He is a Fellow of the Royal Society, and of the Royal College of Physicians. He is a prominent advocate of vivisection.

FERROTYPE, a term applied to designate some photographic processes in which salts of iron play an important part. The term is also applied by photographers to a cheap and instantaneous method by which a positive picture is fixed, by the collodion process, on thin sheets of iron.

FERRUGINOUS, a term employed in chemistry to denote the presence of iron in natural waters, minerals, etc. It is synonymous with the term chalybeate.

FERRY. See *Britannica*, Vol. IX, p. 111.

FERRY, JULES, an eminent French statesman, born at Saint-Dié in 1832. He was admitted to the

Paris bar in 1854, and identified himself with the opponents of the Empire. He was condemned as one of the "thirteen" in 1864. In 1869 he was elected to the Corps Legislatif. He voted against the war with Prussia, but during the siege he was a prominent member of the Government of National Defense. After the war he was minister at Athens, and in 1879 he became minister of public instruction. He introduced a bill directed against the Jesuits, which was passed by the deputies, but twice thrown out in the Senate. The expulsion of the Jesuits was effected by decree founded upon disused laws, and the ministry was dissolved in 1880. He then formed a cabinet and embarked on a policy of "colonial expansion." His cabinet resigned in 1881 on the question of the expedition to Tunis. He became prime minister again in 1883, but his ministry was overthrown in 1884 by an adverse vote relative to the war with China. This was regarded as his political death and he continued in retirement for nine years, until, in the beginning of 1893, he was recalled to public life during the Panama Canal excitement. He was forthwith elected to the presidency of the Senate, but died suddenly a few days later, in March, 1893.

FESA, or FASA, a town of Persia, in the province of Fars, 80 miles southeast of Shiraz, is situated in a mountain defile, and is of considerable size. It has manufactories of silken, woolen, and cotton fabrics and some trade in a kind of tobacco. Population, 18,000.

FERTILIZERS, a name given to substances which, when applied to the soil, supply it with the elements required to make it fruitful and productive. See *MANURE*, *Britannica*, Vol. XV, pp. 505-12.

FESCENNINE VERSES were a sort of dialogues in rude extempore verses, generally in saturnine measure, in which the parties rallied and ridiculed one another, and which formed a favorite amusement of the country people on festive occasions. The amusement often degenerated into licentiousness that at last required the curb of law. The style originated at Fescennia, and became popular at Rome.

FESCUE (*Festuca*), a large and widely diffused genus of grasses, very nearly allied to brome grass, and including many of the most valuable pasture and fodder grasses.

FESS. The fess in heraldry consists of lines drawn horizontally across a shield, and containing the third of it between the honor point and the nombril. It is one of the honorable ordinaries, and is supposed to represent the waist belt or girdle of honor, which was one of the insignia of knighthood. A shield, or charge in a shield, is said to be *party per fess* when it is horizontally divided through the middle, or, as the French say, simply *coupé*. Fesswise is said of a charge placed in *fess*—that is to say, horizontally across the shield.

FESSENDEN, WILLIAM PITT (1806-69), a United States Senator. He was admitted to the Maine bar in 1827. In 1832, and again in 1840, he was elected to the State legislature. In 1840 he became a member of Congress, and in 1845-46 was once more in the legislature, and also in 1853 and 1854. He took his seat in the United States Senate in 1854, and was reelected in 1859. In 1864 he was called to the head of the Treasury, but resigned the following year to return to the Senate, to which he had been elected for the third time. During his service in the Senate Mr. Fessenden was an acknowledged leader of the Republican party.

FESSLER, JOSEPH, an Austrian prelate born at Lochau, Tyrol, Dec. 2, 1813, died April 25, 1872. He studied theology at Brixen, was ordained in 1837, in 1841 became professor of church history and

canon law at Brixen, and in 1852 professor of church history in the University of Vienna. He was made bishop of St. Pölten in 1865, and was general secretary of the Vatican Council in 1869. He published *Institutiones Patrologicae* (1850-52), and *Sammlung Vermischter Schriften* (1869).

FESTOON: in architecture, a sculptured wreath of flowers or fruit, frequently used as an ornament in Roman and in Renaissance buildings. Like many of the other ornaments of classic architecture, it owes its origin to one of the sacrificial emblems, namely, the flowers with which the heads of the animals, the altars, etc., used to be decorated. The festoon occurs along with bull's heads on the frieze of the temple of Vesta at Tivoli.

FETID LIMESTONE, a variety of limestone which gives out, on being violently rubbed or struck with a hammer, a smell like that of sulphureted hydrogen gas. It has a dark color, produced, very probably, from the perishable portions of the animals whose hard skeletons compose the rock.

FEU-DE-JOIE, or **RUNNING FIRE**, a discharge of musketry into the air, made in honor of a victory or other occasion. It commences with the right hand man of the line, who discharges his rifle, and is followed successively at scarcely perceptible intervals by the man on his left until the extreme left of the line is reached. The effect much depends on the regularity with which the slight interval between the discharge is preserved.

FEUILLANS, **CONGREGATION OF**, a reform of the Cistercian order, remarkable as forming part of the great religious movement in the Roman Catholic church during the 16th century, contemporary with and probably stimulated by the progress of the Reformation. The author of this reform was Jean de la Barrière, abbot of the Cistercian monastery at Feuillans in Languedoc, who laid down for himself a new and much more austere course of life, in which he soon found many associates among the brethren of his order. The rule thus reformed was approved by Pope Sixtus V. The name was adopted by a French revolutionary club which held its meetings in the convent of the order in the Rue St. Honoré in Paris.

FEUILLET, **OCTAVE**, a French novelist, born at Saint Lo, in La Manche, Aug. 11, 1812, died Dec. 29, 1890, was educated at the College of Louis le Grand, Paris. He was for some time a literary assistant of Dumas, and began his own career with *Le Fruit Défendu* in the "Revue Nouvelle." In 1848 he published in the "Revue des Deux Mondes" a series of proverbs, comedies, tales, and romances which were collected in *Scènes et Proverbes* and *Scènes et Comédies* (5 vols., 1853-56). In 1862 he was elected to the French Academy, and was afterwards librarian to the emperor. His most noted novel, *Le Roman d'un Jeune Homme Pauvre* (1858), gained great popularity throughout Europe, and *Histoire de Sibylle* (1862) was also very successful. These were followed by *M. de Camors* (1867); *Julia de Trécœur* (1872); *Un Mariage dans le Monde* (1875); *Les Amours de Philippe* (1877); *Le Journal d'une Femme* (1878); *Histoire d'une Parisienne* (1881), and *La Mort* (1886). He also wrote many successful comedies.

FEVEDA, an island of British Columbia, situated in the Gulf of Georgia, between Vancouver Island and the continent. It possesses a snug harbor. Its formation is understood to be wholly of limestone.

FEVER BUSH, the *Lindera Benzoin*, a lauraceous shrub common in the Northern States. It has an agreeable aromatic odor, and decoctions of its bark and leaves are used as a remedy for low fevers and other complaints. It is also called spice bush and Benjamin tree.

FEVERFEW, a perennial plant botanically allied to Camomile, and much resembling it in its properties, but differing in appearance, the segments of its leaves being flat and comparatively broad and its flowers smaller. Its habit of growing is erect, its stem is branched, and from one to two feet high. It has a strong and somewhat aromatic smell. The double varieties are common in gardens. It has been much cultivated for medicinal purposes, and is used in the cure of fevers.

FEVERS. See *Britannica*, Vol. IX, p. 125.

FEVERWORT, a perennial plant of the natural order *Caprifoliaceae* having an erect, round, hairy, fistular stem, from one to four feet high, opposite ovate-lanceolate entire leaves, axillary whorls of flowers, with tubular 5-lobed corolla and leathery three-seeded berries. It is found in North America, where it is dried and the roasted berries have been occasionally used as a substitute for coffee. It is chiefly valued for its medicinal properties.

FIASCO, a failure in a musical or dramatic performance. It is a term borrowed from the Italian theater, and now naturalized in France and Germany. In Italy it is not uncommon to hear an audience cry: *Olà, olà fiasco*, even when the singer has made only one false note.

FIBRE. See *Britannica*, Vol. IX, p. 131.

FINDLAY, a city of Ohio, and county-seat of Hancock county, located in the northwestern part of the State, about 45 miles south of Toledo. In 1884 there were in Findlay three public school buildings, and in 1890 there were 12. During the same period the churches increased in number from 13 to 20. An elaborate system of water works has been constructed at a cost of \$350,000, and a court house erected costing \$320,000. The city is an important manufacturing center, there being in 1891 no less than 120 manufactories. Natural gas is the principal fuel. Population in 1880, 4,633; in 1890, 18,674.

FICHET, **GUILLAUME**, born early in the 15th century, was rector of the University of Paris in 1467, and afterwards held office under Pope Sixtus IV. Through his influence the printing press was brought from Germany to the Sorbonne.

FID, a large, pointed pin with an eye at the thick end. It is made of iron or lignum vitæ, and is used by sailors in separating and interlacing the strands of which the rope is composed. A *mast-fid* is a bolt inserted through the bottom of a ship's top-mast, with ends resting on the trestle-trees sustained by the head of the lower-mast or top-mast. Unless the mast-fid be withdrawn, the supported mast cannot be lowered.

FIDDMIN, a village of the Fayoom, inhabited by Mussulmans and Copts. It is remarkable for a large olive popularly supposed to be the original one planted in Egypt, and yielding annually 268 pounds of olives.

FIELD: in heraldry, the whole surface or content of the escutcheon or shield. It is so called, according to some, because it represents the field of battle on which the achievements or charges represented on it are supposed to have been gained. In blazoning, the tincture or metal of the field must be the first thing mentioned.

FIELD, **CYRUS WEST**, whose name is identified with submarine telegraphs, was born in Stockbridge, Mass., in 1819, and became a merchant in New York city. In 1853 the project of a submarine cable interested him, and he organized the New York, Newfoundland, and London Telegraphic Company in 1854, and the Atlantic Telegraph Company in 1856. In 1858 the first trans-Atlantic telegraph was completed, but soon ceased to work, and Mr. Field was driven to renewed exertions,

until in 1865-66 another cable was laid by the *Great Eastern*, and communication established. He has been largely interested in the New York elevated railway system. He died in July, 1892.

FIELD, DAVID DUDLEY (1781-1867), an American clergyman, was licensed to preach in 1803. He was ordained in 1804, and till 1818 was minister in the Congregational church in Haddam, Conn. From 1819 to 1837 he was pastor of the church at Stockbridge, Mass., and from the latter year until 1844 was again in Haddam. From 1844 to 1851 he had charge of the church in Higganum, when he retired, and returned to Stockbridge, where he passed his remaining days. He wrote considerably on historical topics.

FIELD, DAVID DUDLEY, an American lawyer, son of the preceding, born in 1805. He was admitted to the New York bar in 1828, and continued in the active practice of his profession until 1885. In 1847 he was appointed commissioner on practice and pleadings, and as such took part in the preparation of the code of procedure. The commission submitted the completed *Codes of Civil and Criminal Procedure* to the legislature in 1850, and they have been enacted into law. In 1857 he was appointed by New York State head of a commission to prepare a political code, a penal code and a civil code, and they were completed in 1865. In 1873 Mr. Field presented to the Social Science Congress his *Outlines of an International Code*, which has been translated into French, Italian, and Chinese. As a result an association was formed for the reform and codification of the laws of nations, and Mr. Field was chosen its first president. This association also had for its object the substitution of arbitration for war in the settlement of disputes between nations. Besides numerous contributions to current literature on political topics, Mr. Field has published *Speeches, Arguments, and Miscellaneous Papers* (New York, 1886).

FIELD, HENRY MARTYN, an American clergyman, born in Stockbridge, Mass., April 3, 1822. He graduated at Williams College, studied theology, and from 1842 to 1847 was pastor of a Presbyterian church in St. Louis, Mo. During 1847-48 he traveled in Europe, and on his return to the United States published an account of his experiences and observations abroad. In 1855 he became one of the editors of "The Evangelist," New York, subsequently becoming its proprietor. He is the author of *The Irish Confederates* (1850); *Summer Pictures from Copenhagen to Venice* (1859); *History of the Atlantic Telegraph* (1866); *From the Lakes of Killarney to the Golden Horn* (1876); *From Egypt to Japan* (1878); *On the Desert* (1883); *Among the Holy Hills* (1883); *The Greek Islands and Turkey After the War* (1885); *Blood Thicker than Water*, and *A Few Days Among Our Southern Brethren*.

FIELD, KATE, an American lecturer, born in 1840. After completing her studies in the United States she made long visits to Europe, and became correspondent for the "New York Tribune," the "Chicago Tribune," and the "Philadelphia Press." In 1874 she appeared in *Peg Woffington* at Booth's Theater, New York, and for a time followed the stage with some success. Of late years she has been engaged in lecturing on the topics of the day.

FIELD, STEPHEN JOHNSON, an American jurist, son of David Dudley Field, Sr., born in 1816. In 1837 he began the study of law with his brother, David Dudley, and after his admission to the bar became a partner in the firm. In 1849 he went to San Francisco, and became a member of the first legislature held after the admission of California into the Union. In 1857 he was elected judge of the Supreme Court of California, and in 1863 was

appointed to the supreme bench of the United States. In 1869 he was appointed professor of law in the University of California.

FIELD-ALLOWANCE, a daily allowance granted to officers of the British army in consideration of extra expense entailed upon them in consequence of military operations.

FIELD-GLASS, the lens usually interposed between the object-glass and eye-glass of a microscope, which, receiving the diverging rays from the former before they form an image, contracts the dimensions of the image and increases its brightness, so as to render it of a proper size and degree of distinctness for being viewed by means of the eye-glass.

FIELDING, ANTHONY VANDYKE COPLEY (1787-1855), an English water-color painter. He received his early instruction at home before being placed under John Varley. He worked in the house of Dr. Monro, and in 1810 began to exhibit with the Water-color Society, succeeding Cristall as president in 1831. His early works show breadth, freedom of treatment, and a fine sense of atmosphere, but in later life the quality of his art deteriorated greatly.

FIELD-MOUSE, or MEADOW-MOUSE, a name popularly given to several species both of mouse and vole.

FIELD-OFFICERS: in the army, officers—viz., majors, lieutenant-colonels and colonels—competent to command whole battalions, in contradistinction to those merely intrusted with company duties, as captains, lieutenants and ensigns.

FIELD OF VIEW, the whole space within which objects can be seen through an optical instrument; more strictly, the space within which the image of an object may be seen by whole pencils. That part of the image which is seen by partial pencils of the light from the object-speculum or lens is called the *ragged edge*, and usually a diaphragm is employed to cut it off from the view of the observer altogether.

FIELDS, JAMES THOMAS (1817-81), an American poet, essayist, lecturer and publisher. From 1838 to 1870 he was a member of the firm of Ticknor, Reed & Fields, of Boston, and from 1862 to 1870 edited the "Atlantic Monthly." His contributions to letters were of a high order, and he exerted an important influence on American literature.

FIELD-TRAIN, a department of artillery, consisting of commissaries and conductors of stores, whose duty it is to attend to the formation of proper depots of shot, etc., between the front and base of operations, and to keep a due proportion constantly at the service of each gun during an engagement; they are also responsible for the safe custody of the ammunition.

FIELD-WORKS, intrenchments and other temporary fortifications, thrown up by an army in the field either as a protection from the onslaught of a hostile force or to cover an attack upon some stronghold.

FIFE, DUKE OF, ALEXANDER WILLIAM GEORGE DUFF, was born on Nov. 10, 1849, created Earl of Fife in 1885, and Duke of Fife in 1889, on his marriage with Princess Louise Victoria, the eldest daughter of the Prince of Wales. The Duke was educated at Eton; is Lord Lieutenant of Elginshire; a member of the Council of the Duchy of Lancaster; and a partner in the metropolitan banking firm of Sir Samuel Scott and Co. He sat as M. P. for Elgin and Nairn, in the liberal interest, in 1874-79; went on a special mission to the King of Saxony in 1882; and in recognition of his diplomatic services received the first Order of Saxony.

FIFTH: in music, an interval comprising five degrees of the scale. A perfect fifth is the equal to three diatonic steps and a half; a fifth a half-step shorter is termed *diminished* or *minor*, and one a half-step longer is termed *augmented* or *superfluous*.

FIGHTING-FISH, a small fresh-water fish of the family *Anabantidae*. It is a native of Asia and particularly of Siam, where it is kept in glass globes on account of its pugnacity. When two of these creatures are brought together they rush immediately to combat. Fish fights are a favorite amusement of the Siamese.

FIGUERAS, ESTANISLAO, born at Barcelona, Spain, Nov. 13, 1819; was elected to the cortes as a republican in 1850, and was imprisoned for conspiracy against Isabella. In 1870 he was a member of the provisional government, and in 1873, after the abdication of Amadeus, was president of the Spanish republic. He died in Madrid in 1882.

FIGUEIRA, a watering-place in the Portuguese province of Beira, at the mouth of the Mondego, 23 miles west by south of Coimbra. Its harbor is excellent, but difficult of access. Population, 4,470.

FIGUIER, GUILLAUME LOUIS, a French scientific writer, born at Montpellier, Feb. 15, 1819. He studied chemistry there, and in 1841 received the degree of M.D. He was appointed professor at the Montpellier school of pharmacy in 1846, and seven years later removed to Paris to occupy a similar post there. He has published: *Exposition et Histoire des Principales Découvertes Scientifiques Modernes* (1851), *L'Alchimie et les Alchimistes* (1854), *Histoire du Merveilleux dans les Temps Modernes* (1859-60). A number of his popular presentations of science and natural history have been translated into English. Among these are: *The Vegetable World*; *The Ocean World*; *The Wonders of Science*, and *The Wonders of Industry*.

FIGURANTES, the term applied in the ballet to dancers who do not come forward alone, but dance in troops, and also serve to fill up the scene and form a background for the solo dancers.

FIGURE: in general, the outline or surface of a body determining its form or shape. In arithmetic figure denotes a numerical character. In geometry it denotes a surface or space inclosed on all sides, and is superficial when inclosed by lines, solid when inclosed by surfaces.

FIGURED, or FIGURATE: in music, opposed to *simple*, characterized by the use of passing notes. The term was formerly used in ecclesiastical music to distinguish chants which had been varied, and rendered more ornamental and expressive, from the original Gregorian chants which were exceedingly plain. The term was afterwards applied to elaborate pieces in distinction from those of "strict" style.

FIGURED BASS: in music, a base part with figures placed over the notes, which indicate the harmony to be played to each note, and serve as a guide to the accompanist.

FIGWORT, a genus of plants of the natural order *Scrophulariaceæ*. They are mostly herbaceous and natives of temperate regions. The roots of some are purgative and emetic.

FIIJ, or FEJEE, an island group and British crown colony in the South Pacific. For the history and earlier statistics of the Fiji Islands, see *Britannica*, Vol. IX, pp. 155-158. Fiji was ceded to the Queen of England by the native chiefs and people, and the British flag hoisted by Sir Hercules Robinson, Oct. 10, 1874. The government is administered by a governor appointed by the crown, assisted by an executive council, consisting of the colonial secretary, the attorney-general, the receiver-general, and the commissioner of lands. Laws are

passed by a legislative council, of which the governor is president. It comprises six official members and six unofficial members nominated by the crown. For the purposes of native government, the colony is divided into 16 provinces, in 14 of which a superior native chief exercises, under the title of *Roko-Tui* of his province, a form of rule which recognizes to a large degree the customs and the system of administration by which the people governed themselves prior to the establishment among them of a European form of government. In two of the provinces there are resident European officers as commissioners. The island of Rotumah was added to the colony of Fiji in 1881.

The present total area of the Fiji Islands is about 7,740 square miles. In 1891 the population of the colony was as follows:

Europeans.....	2,036
Half castes.....	1,076
Indian immigrant laborers.....	7,468
Polynesian immigrant laborers.....	2,267
Fijians.....	105,800
Natives of Rotumah.....	2,219
Others.....	314
Total.....	121,180

Two public schools receive state aid to the extent of about \$1,200 a year each, one in Suva and one in Levuka. The number of scholars attending these two schools in 1889 was 157. The education of the native Fijians is almost entirely conducted by the Wesleyan Mission, in whose schools 40,667 children were taught in 1889. A number of schools are also conducted by the Roman Catholic mission, the number of scholars being 2,586. There is also an industrial and technical school carried on by the government in which 62 native youths are being trained in the elementary branches of reading, writing, and arithmetic, in boat-building, house-building, and cattle-tending.

The estimated revenue for 1891 was £65,376, and the expenditure £63,716. The public debt of the colony is £248,999.

In 1893 there were, under cultivation by European settlers: bananas, 2,460 acres; coffee, 27 acres; cocoanuts, 18,939 acres; maize, 334 acres; sugar-cane, 12,626 acres; yams, 168 acres; tobacco, 25 acres; pine-apples, 127 acres; other products, 648 acres. There were in the colony, in 1893, 695 horses and mules, 8,768 cattle, 6,838 sheep, and 4,502 Angora goats.

The value of the total foreign trade during the five years from 1885 to 1889 inclusive was as follows:

Year.	To'l For'gn Trade.	Imports.	Exports.
	£	£	£
1885	627,780	301,030	326,750
1886	514,125	230,629	283,496
1887	469,151	188,071	281,080
1888	560,200	183,222	376,978
1889	553,674	189,393	364,281

The principal imports during 1892 were hardware, drapery, meats, rice, breadstuffs and biscuits, bags and sugar mats, and timber; and the exports, sugar, copra, green fruit (consisting chiefly of bananas), distilled spirits, desiccated cocoanuts, peanuts, and tea.

FILE: in a military sense, a row of men arranged one behind the other forming a line from front to rear. A battalion stands two deep, or in two ranks, front and rear, wherefore a file consists of two men. Sometimes the battalion may be formed much more solidly, as in a square, when

the file comprises a far larger number. The number of files in a company describes its width, as the number of ranks does its depth.

FILIOQUE, a Latin term interpolated in the Nicene Creed, and held to teach the procession of the Holy Ghost from the Father and the Son. The Greek church denying and the Latin church retaining this formula, it has given rise to many controversies, and has been the chief point which for so many ages has kept the two churches apart.

FILIPO D'ARGIRO, SAN, a town of Sicily, in the province of Catania, situated on the right bank of the Traina. A considerable quantity of saffron is grown in the vicinity. Population, 7,500.

FILLET: in heraldry, an ordinary which contains the fourth part of the chief.

FILUM AQUÆ, an imaginary line dividing the soil underneath a river into two equal portions.

FIN-BACK, a species of whale with a prominent dorsal fin not found in other species.

FINDLAY, the county-seat of Hancock county, is a flourishing town in the northwestern portion of Ohio. In 1885 it possessed few commercial advantages, but by the discovery of natural gas in that year it received an extraordinary impulse. By June 1, 1889, there were 43 wells in operation. The "Great Karg" well was the largest in the world until the discovery of the Tippecanoe in 1888. Numerous manufactories have been established, eleven glass works employ 1,700 men, and two pressed-brick works have an output of 40,000,000 bricks per annum. Findlay was one of the first places where aluminum was manufactured in commercial quantities. The city has several fine public buildings, among them a court house, a substantial stone structure costing over \$300,000. There are 18 churches. Pop. (1890), 18,553.

FINERTY, JOHN F., born in Galway, Ireland, in 1846, was educated in private schools, and became identified while still a boy with the Irish revolutionary movement. In 1864 he left Ireland, came to this country, and served for about a year in the Union army. He became attached to the press of Chicago in 1865, and in this capacity witnessed the Fenian raids in Canada in 1866 and 1870. Thereafter he served in various capacities on other Chicago newspapers, and as a press correspondent visited the Rio Grande, Texas and Old Mexico, and was with General Miles during the historical campaign against Sitting Bull in 1879. Mr. Finerty organized the Irish Land League convention which met in Chicago in 1881, and which raised \$500,000 for the cause of Ireland. In 1882 he began the publication of the *Citizen* newspaper, and in November of that year was elected to Congress as an Independent from the second district of Illinois. He published in 1890, "Warpath and Bivouac, or the Conquest of the Sioux Indians."

FINLAY, ROBERT BANNATYNE, was born at Edinburgh in 1842, and educated at the Edinburgh University, where he studied medicine and took his doctor's degree in 1863. Two years later he gave up medical practice and began to study for the English bar. He was called, in 1867, at the Middle Temple. He joined the Southeastern Circuit, and was made a Queen's Council in 1882. At the general election of 1885 he succeeded in gaining a seat for Inverness Burghs, and in 1886 he was again returned for the same constituency as a Unionist Liberal. Up to the election of 1885 and the rise of the Home Rule question, Mr. Finlay had made no great mark in the House, but during the debates on Mr. Gladstone's Government of Ireland Bill he rose into a very important position. Since that time Mr. Finlay has been before the public in several capacities.

FINLAND. For the history and earlier statistics of the Grand Duchy of Finland, see Britannica, Vol. IX, pp. 216-220. The constitution of Finland, dating from the year 1772, reformed in 1789, and slightly modified in 1869 and 1882, provides for a national parliament, consisting of four estates—the nobles, the clergy, the burghers, and the peasants—convoked by the "Grand Duke," Emperor of Russia, for four months. They discuss the schemes of laws proposed by the emperor, who has the right of veto. The unanimous assent of all four chambers is necessary for making changes in the constitution and for levying new taxes. The national representatives have been regularly convoked, since 1861, every four or five years; the last time they met was in 1888. The schemes of laws are elaborated by the "Committee for the Affairs of Finland," which sits at St. Petersburg, and consists of the state secretary and four members, nominated by the crown (two of them being proposed by the Senate). The Senate, which sits at Helsingfors under the presidency of the governor-general, is nominated by the crown. It is the superior administrative power in Finland, and consists of two departments, justice and finance, which have under them the administration of posts, railways, canals, custom-houses, hygiene and the tribunals. The military department is under the Russian ministry of war, and the foreign affairs under the Russian chancellor. Finland has its own money and system of custom-houses. Recent laws have, however, altered this to some extent. According to a law of Aug. 14, 1890, the circulation of Russian rubles and silver money has been rendered obligatory. The penal code, elaborated by the Senate, which was to have been promulgated on Jan. 1, 1891, was suspended by the Russian government till further notice.

The present area of Finland is 144,255 square miles; population (1888), 2,305,916. The following table shows the area of the several provinces, with the population for 1888:

Province.	Area.	Populat'n.	Density per sq. mile.
Abo-Bjorneborg	9,335	380,501	40
Kuopio	16,499	277,635	16
Nyland	4,586	227,388	49
St. Michel	8,819	175,110	19
Taxasthus	8,334	245,690	29
Uleaborg	63,971	234,015	3
Viborg	16,627	380,823	19
Vasa	16,084	398,750	24

The gradual increase of the population is seen from the following table:

Years.	In towns.	In country.	Total.
1830	75,489	1,396,588	1,372,077
1870	131,603	1,637,166	1,768,769
1880	173,401	1,837,381	2,060,782
1885	199,484	2,003,874	2,203,358
1886	204,998	2,027,380	2,232,378
1887	211,589	2,069,333	2,270,912
1888	.....	.....	2,305,916

Of the total population there were, in 1888, 2,261,741 Lutherans; 41,896 Greek Orthodox and Raskolniks; 2,279 Roman Catholics.

The chief towns, with the population (1888), are: Helsingfors, 58,417; Abo, 27,996; Tammerfors,

18,097; Wiborg, 17,494; Uleaborg, 12,183; Bjorneborg, 9,632; Nikolaistad (Wasa), 8,454; Kuopio, 8,141.

The immigration in 1888 was 45,163, and the emigration 44,914.

In 1889 Finland had one university, with 1,703 students; one polytechnic, 132 students; 16 lyceums (12 state), 3,218 pupils; 16 progymnasiums, 1,402 pupils; 27 real-schools, 1,051 pupils; 52 girls' schools, 4,057 pupils; 971 primary schools and kindergartens, with 62,893 pupils; 4 normal schools, with 563 pupils. There are besides 7 navigation schools, with 113 pupils; 6 commercial schools, with 162 male and 135 female pupils; 32 Sunday professional schools, with 2,111 pupils; 2 agricultural institutes, 9 agricultural and 14 dairy schools, with 257 male and 148 female pupils; 18 trade schools, with 1,220 pupils.

The estimated revenue for 1890 was 54,153,331 marks (16,091,000 marks being left from previous budgets), and expenditures the same (17,543,562 marks being left for the next year). The public debt on Jan. 1, 1890, amounted to 85,130,944 marks, of which 7,851,700 marks internal.

The crop of 1887 was, in bushels: Wheat, 146,760; rye, 12,397,700; barley, 5,829,620; oats, 13,549,400; sarrazin, 46,130; peas, 385,270; potatoes, 15,110,720; flax, 1,717 tons; hemp, 983 tons. Of domestic animals Finland had: horses, 258,666; horned cattle, 952,640; sheep, 1,042,790; swine, 184,755; reindeer, 64,898; goats, 18,700; poultry, 258,642.

The chief articles of export are timber, butter, paper and card-board, iron, corn, cotton, leather, hides, tar, and pitch; of import, corn and flour, coffee, iron, woolen cloth, sugar, raw cotton, chemicals, leather-ware, machinery, tobacco, colors and oils.

FINLEY, JAMES BRADLEY (1781-1856), an American clergyman. In 1809 he entered the Methodist Ohio Conference, and in 1816-21 was a presiding elder. In 1821-27 he was a missionary to the Wyandot Indians, and from 1829 to 1845 was an itinerant minister. From 1845 to 1849 he was chaplain of the Ohio penitentiary, and then acted as conference missionary and pastor in Southern Ohio till his death. His principal publications are reminiscences of his experiences.

FINLEY, SAMUEL (1715-1766), an American educator, born in Ireland, came to the United States in 1734. He studied for the ministry, was licensed to preach in 1740, and ordained two years later. He was pastor in different places until 1761, when he was chosen president of Princeton College, Princeton, N. J. He held this position until his death.

FINMARK, a province of Norway, lying between 68° 30' and 71° north latitude, and 17° and 31' east longitude, and constituting Norwegian Lapland. It has an area of about 20,000 square miles. The interior is intersected by a range of snow-covered

mountains, reaching an elevation of 4,000 feet. Agriculture is impracticable above an elevation of 100 feet; fish and game constitute almost the sole food of the inhabitants. The principal sources of wealth are the reindeer in the north, and the cod-fisheries in the south. Population, 24,071.

FINNEY, CHARLES GRANDISON (1792-1875), an American Presbyterian clergyman, licensed to preach in 1824. He became an evangelist and labored with great success in Utica, Troy, Philadelphia, Boston and New York. From 1835 until his death he was professor of theology at Oberlin College, Ohio, and in 1851-66 was its president. He spent three years in England as a revivalist.

FINSTERAARHORN, the highest peak (14,026 feet) of the Bernese Alps.

FINSTERWALDE, a small town of Prussia, in the province of Brandenburg, situated on an affluent of the Black Elster, 40 miles north of Dresden. It has manufactories of cloth and machinery; spinning and weaving are also carried on. Population, 7,371.

FIORD, or FJORD, the Scandinavian name for a narrow arm of the sea penetrating deeply into the land and bounded by more or less precipitous slopes or cliffs on each side. The coast of Norway, of Iceland and Greenland abound with examples of fiords.

FIR. See Britannica, Vol. IX, p. 222.

FIRE-ARMOR, appliances fitted for use in burning buildings to facilitate escape or the use of fire-extinguishing apparatus, and for work in mines filled with choke-or fire-damp. It is of two kinds. In one the wearer breathes from a supply of compressed air carried in a suitable reservoir; in the other the air is filtered through some porous substance, moistened and interposed between the wearer and the atmosphere. The efficacy of each has been proved beyond dispute. The latest invention is that of George Crofutt, 1873-74, termed the "eye and lung protector," a species of mask held over the face by an elastic band passing around the head. It weighs but a few ounces, and may be instantaneously fitted into place. The wearer breathes through a moist sponge contained in a porous cotton bag, which not only cools the air passing through it, but also eliminates dust, noxious gases, foul odors, etc. The eyes are protected by plates of transparent mica inserted in a duplex steel shell, so covered and edged with rubber as to exclude smoke and dirt.

FIREARMS, weapons, of whatever form, from which missiles, such as shot, shell or bullets, are propelled to a distance by the combustion of gunpowder or other similar explosive. See GUNS and GUNNERY, in these Revisions and Additions.

FIREBOTE: according to English law, the right of a tenant to cut wood on the estate for the purpose of fuel.

FIRE DEPARTMENT AND APPARATUS, RECENT IMPROVEMENTS IN.—One improvement has followed another so rapidly, in the past few years, that even the apparatus of a decade ago seems antiquated.

The steam engines of later years vary materially in construction. In one type the boiler has inch tubes depending from its roof, like stalactites, down into the fire; thus, the water in them gets the full benefit of the heat; in another, small groups of tubes are hung like tiny steam radiators to the roof of the fire-box, and connected with the side of the box as well, so that the water circulates up through a nest of small tubes; a third

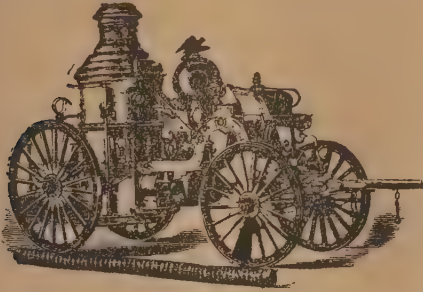
type has a coil of water-pipe running around the fire, and down into the side of the fire-box. Each type has its advocates.

A feature, not generally known by the spectator, is the water-tank for supplying the boiler. It is generally located under the driver's seat, and is used only when the engine is pumping salt or foul water.

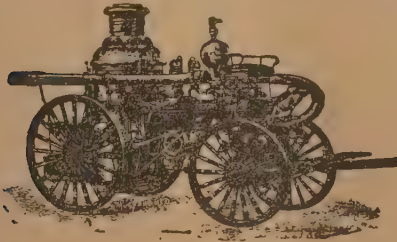
The most powerful land engines have two steam cylinders, capable of throwing solid water through a two inch nozzle two hundred feet over level ground.

The hose is usually carried on a reel or spool supported on two or four-wheeled vehicles. A

very late invention is a simple four-wheeled truck, with a bed or box, in which the hose is laid flat. It is rapidly becoming popular; for in practice it is found that it can be stretched for work more quickly, and when the fire is out can be loaded more readily.



A WATER TOWER consists of an iron tube so pivoted over one end of a truck that its top may be raised to a height of 60 feet above the street pavement. The upper end of the pipe ends in a nozzle controlled by a man on the truck. Two, three, or four engines may be coupled at the base, and their united streams forced through the pipe and out at the nozzle. They send a solid two and a quarter inch stream through the top windows of a six-story building with ease. The earliest towers were put in position by man-power; the later ones are raised by carbonic acid gas, generated in a retort suspended near the rear axle of the truck, and acting upon the piston rods of two cylinders very like steam engine cylinders. The gas is quickly generated and in sufficient quantity to exert a pressure in the cylinder of over 100 pounds to the square inch. A derrick is raised



over the forward wheels of the truck, and with the aid of this derrick the pipe is rapidly brought into a perpendicular position by means of a metal rope, working over pulleys, and a hand winch.

LADDERS.—The trucks usually carry ten ladders, varying in length from ten to 75 feet. Some are 92 feet long. These longest are permanently fixed to turn tables on the trucks that carry them, and are raised by cranks, screws, and pulleys.

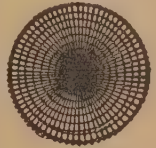
By their use, persons on the tops of buildings, or in the upper stories, can be quickly and readily swung over onto the roofs of adjoining buildings, or across the street to a place of safety.

SCALING LADDERS are unique contrivances, and consist of a single rod, with rungs passing through, or bound to it, and a hook with reach enough to grasp any wall over the window sill. Scaling ladders are of the greatest benefit in securing an entrance to a building through the windows, and in

rescuing lives. The fireman raises the ladder, drives the hook through the window of the first story, and catches it over the sill; climbs up, throws his leg over the sill, and lifts the ladder to the next story. If he discovers that the window immediately above is so full of flame that he cannot use it, he reaches with his ladder for one on either side, then swings loose, vibrating like a pendulum. He goes in this way to the proper height, when he lowers a cord to the ground, to which a life line is attached, and people who could not otherwise escape, are safely lowered.

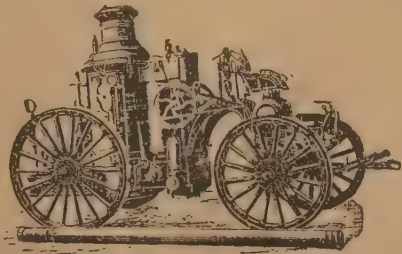
THROWING A LINE WITH A RIFLE is a novel device for quickly reaching the top of a building. A smooth bore Remington rifle with a ten-inch wound barrel is used. The projectile is a long, pear-shaped cap that fits over the muzzle with the end of a light line fixed fast to a ring in its base. A blank cartridge does the work. The line goes upward a distance of 200 feet, and when it falls is caught, and used to draw up the heavier line.

THE NET.—If the fire be such that the life-line would be burned, and thereby be rendered worthless, there is provided a wheel-shaped net, made of slender ropes, and of 10 feet diameter. It is held by as many determined men as can get hold of it. When ready they call upon the victim to jump; and the frightened one, imprisoned by smoke and flame, and with no prospect but death if he stays, rarely disobeys the command. While not every one escapes unhurt, there are instances where men weighing 200 pounds have safely jumped a distance of 100 feet.



IRON PIPES fixed to buildings are of the greatest benefit by reason of being constantly in place. They are put both on the outside and the inside of buildings, according to the taste of the owner, and extend from the street or sidewalk above the roof, also to the cellars and sub-cellars, where they are especially valuable. On the inside short branches project from the main pipe, and to these are usually attached the necessary length of hose for protecting that story. Where buildings are thus provided for, it is only necessary to attach the engine hose to the iron pipe built on or into the house, and the fireman goes within to find everything ready for immediate use. Such pipes are of the greatest use when fires are smouldering in a cellar. The minutes lost in carrying hose through doorways, or breaking openings through sidewalks, have resulted in the loss of many buildings.

THE AIR-WASHER is a device for washing the smoke out of the air in any room, but is especially



intended for use in cellars. It is a short section of pipe fitted with a sprinkler after the manner of a lawn sprinkler. In its use a hole is cut through the floor; if no other way is found the washer is

passed through, the water turned on, and showers are thrown in all directions.

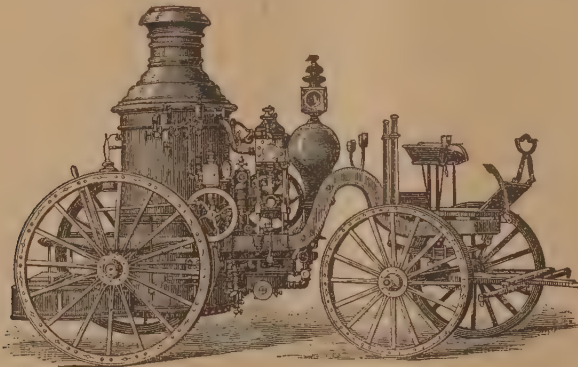
FLOATING ENGINES, or FIRE BOATS, the best of which are built of steel, are about 125 feet in length; 25 to 27 feet wide, and draw about 9 feet of water. They are provided with monster boilers, and triple expansion engines. There are two propeller wheels, one being connected with the rudder and the wheel shaft in such a way that it swings with the rudder, and aids the boat in turning almost upon her center.

The pumps are in four sets of two each. From them the water is forced into an aircamber, thence through four standing pipes which rise through the deck-house—two forward and two aft. The nozzles at the ends of the pipes are so attached that they control every possible direction in which it may be desired to turn them. The floating engines are kept with fires partially banked, but steam up. At a signal the fires are raked, the lines thrown off, the throttle thrown open, and the conflagration headed for. At a rate of nearly 20 sea-miles an hour she rushes along, dodging the sea-craft with remarkable ease by reason of the rudder-propeller attachment, and if the fire be at the water's edge, as on a pier or steamer, can run

so close that the flames envelop her stem. The whole power of the boilers is quickly turned upon the pumps with no loss of time, for there is no hose to lay. The force of the water driven through the five-inch nozzle is such that it carries all wood-work before it, tears off roofs, and even bursts through brick walls, thus obviating the use of axes.

On these floating engines there are always screens for protecting the men who would otherwise be exposed to the fury of the flames. The screens are made of steel plate, and are double, having an air-space between. Each section is six feet long, and four and a half feet above the rail arching over the deck. Peep-holes to look through, and other holes large enough to direct a small stream through are also provided. If the decks or any other part of the water engine become too hot for safety or comfort, the captain, instead of backing the boat out to cool off, turns the water on from skillfully arranged sprinklers, thus protecting the workers while they attend to the greater fire.

A FIRE-PROOF SUIT.—The Imperial German government has introduced a fire-proof suit of such efficiency that a fireman may approach a conflagration, either in a building or on board ship, with



STEAM FIRE ENGINE.

comparative freedom from danger. It consists of a helmet, jacket, trousers, boots, and mittens. The helmet is constructed of light wicker work, covered with a composition making it perfectly air and water tight. In the front part of the helmet is a glass window, which closes hermetically, but which may be opened and closed by the wearer as may be required. Connected with the helmet is the jacket and hose or trousers made of water-proof double material. The trousers are supported by leather suspenders. The jacket falls over the trousers at the waist, and is fastened by a belt. The sleeves of the jacket are connected with water-proof gloves. Passing through the back of the helmet is a tube for the conveyance of air, which is distributed by means of smaller tubes throughout the interior around the head of the wearer, thereby keeping the head constantly surrounded with fresh air, and also preventing the accumulations of moisture-cloudiness on the glass, thereby enabling the wearer to see and breathe freely.

The fireman thus encased is further provided with a water-tube, by means of which he is enabled to send a spray of water over himself as an additional protection against fire or heat. By a special tube he can convey water into the helmet

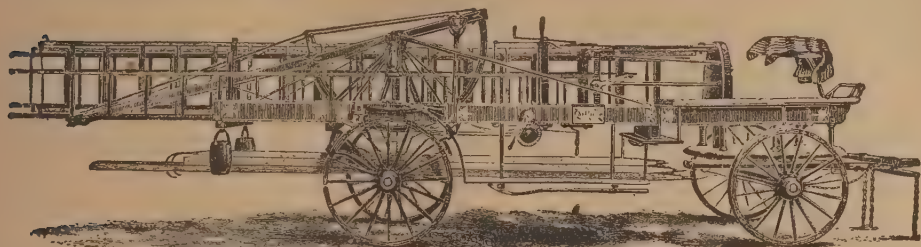
like a douche. Thus protected he can approach a fire with impunity, is enabled to make his investigations, and more successfully combat the danger, whether in dense smoke or fierce flame. The new costume has been adopted by all the fire brigades in Berlin, and by those of other continental cities, and has also been provided for all the vessels of the German navy.

ECONOMY OF TIME.—In no department of human industry is the value of time more clearly recognized than in the modern fire department. The fraction of a minute saved in the first attack upon a fire often means the saving of hundreds of thousands of dollars, while not infrequently a human life may depend upon the celerity with which the brave firemen reach the scene of a conflagration with their ladders, life-lines, nets, and other life-saving appliances. Every agency known to science for economizing time is utilized. The alarm is sounded by electricity (*q. v.*). The same current of electricity which sounds the note of warning in the engine-house releases the fastening of the horses in their stalls. These sagacious animals, thoroughly trained in the performance of their duties, instantly spring to their places in front of the engine. The harness, suspended from hooks overhead, drops

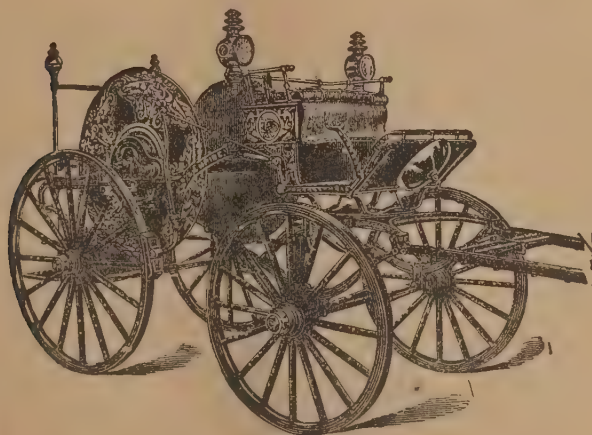
upon their backs, where it is quickly fastened with clasps, the doors of the engine-house fly open, and the horses dash into the street and away to the locality from whence came the alarm—barely *eight seconds* having elapsed between the sounding of the alarm and the exit of the engine from the engine-house. The sitting-room of the firemen is on the second floor, directly over the engine. Stairs which are provided as a means of reaching this room from below, require too much time to descend; hence large holes are made in the floor, in the center of each of which is a brass rod, reaching to the main floor, down which the firemen *slide* in order to save an extra second or two of time. The fireman who should use the stairway, descending it as

quickly as he might, would find, when he reached the ground floor, that the horses were harnessed, the fires lighted, and the engine half a block away. In order to make steam quickly, the water in the boiler of the engine is kept hot at all times, a stationary boiler in the engine-house keeping the water at a proper temperature when the engine is "at rest."

One of the important adjuncts of the fire department of a great city is a school for horses, where these animals undergo a thorough and systematic course of education. After months of patient training only the more intelligent and sagacious horses are assigned to active duty, it being impossible to educate a large percentage of the



LADDER TRUCK.



HOSE CARRIAGE.

animals to the requirements of a well-ordered fire department.

FIRE EXTINGUISHERS.—Of these there is a large variety, each with its advocates. As the apparatus occupies but little space, is extremely portable, and can be made available at a moment's warning, these extinguishers have been extensively introduced for the purpose of subduing small fires, and thereby preventing larger ones. Ordinarily the water is charged with carbonic acid, but other substances are also used.

The fire extinguisher, commonly so termed, is a metal cylinder with a capacity of about a quarter of a barrel. Straps are fastened on either side for the insertion of the arms. It is carried on the

back, the straps passing over the shoulders and under the arms. A short hose is attached, with a nozzle throwing a small stream.

In some varieties, there are two vessels, one containing a bicarbonate, the other a strong acid, sometimes oil of vitriol. These are contained within a larger cylinder containing water. When wanted for use the contents of the two smaller vessels are thrown into the water, carbonic acid gas is set free, and is absorbed by or dissolved in the water, and the whole is immediately ready for use.

In some machines other agencies are used. By opening a suitable valve in the hose or outlet, the confined gas forces out the liquid in a strong jet while yet heavily charged with carbonic acid gas,

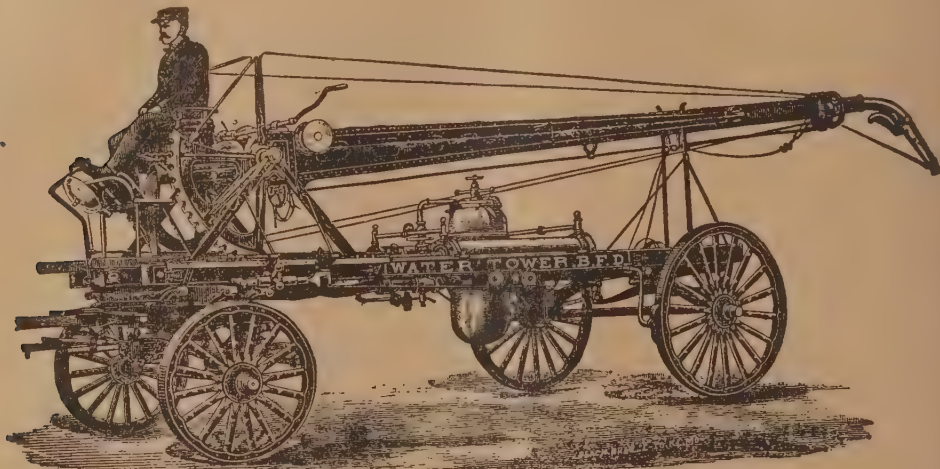
which being non-combustible materially assists the action of the water as an extinguisher.

Another, the "Babcock," has its cylinder filled with a solution of bicarbonate of soda, with a vessel of acid suspended in its upper part. This smaller vessel has a stopper, which, being withdrawn, causes the vessel to tilt over, and the escaping acid mingling with the solution discharges the carbonic acid under heavy pressure.

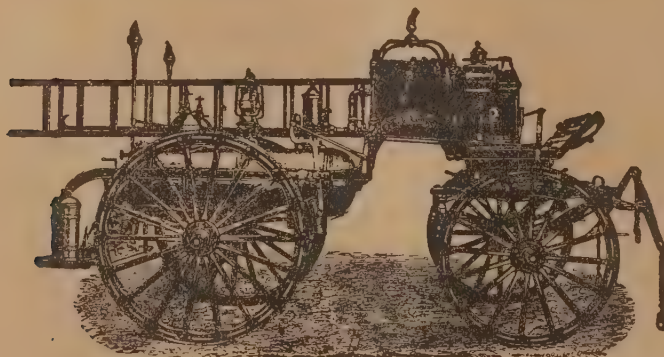
The transition from the small extinguisher to one large enough to necessitate carriage by wheels and drawn by horses, was easy and natural. In

order to provide against the contingency of exhaustion of a cylinder and the apparatus becoming thereby temporarily worthless, as at large fires, an additional cylinder was added, so that while one is in use the other may be resupplied with the necessary chemicals.

Grenades or bombs are small glass spheres readily fitted to convenient places in halls, rooms, offices, etc., and are intended to be thrown by hand against the portions of the structure on fire, thus breaking the glass and liberating the contents for extinguishing the flames.



WATER TOWER.



CHEMICAL FIRE ENGINE.

FIREFLY, a name applied to many "phosphorescent" insects, which are all included within the order Coleoptera, or beetles. Some of them (among the Elaters) give forth a steady light, and these may be distinguished as fireflies proper from the Glow-worms and "lightning-bugs" (among the Lampyridæ), which flash light intermittently. In the phosphorescent Elateridæ, furthermore, the production of light has its seat more anteriorly than in the Lampyridæ, where it is abdominal.

The most brilliant fireflies are species of *Pyrophorus*, most at home in tropical America. One

form—*Pyrophorus noctilucus*—common in the West Indies and Brazil, attains a length of about an inch and a half, and has a dark rusty-brown color. On the upper surface of the first ring of the thorax are two yellowish oval spots which are brilliantly luminous during the nocturnal activity of the beetle, while on the first ring of the abdomen a still brighter organ is situated. The luminous organs are special modifications of the epidermic cells, which are disposed in two layers, of which the outer alone is luminous. The luminosity depends on a process of oxidation; the oxygen is

supplied by the tracheæ, and the brilliancy varies with the respiratory activity. What the substance oxidized really is remains undiscovered.

The light of these living lamps, or *cucujos*, as the Mexicans call them, has frequently saved a traveller's life; the Indians "travel in the night with fireflies fastened to their hands and feet, and spin, weave, paint and dance by their light," and they are often used for decorative purposes. A few of them in a glass vessel give light enough to read by, and when not wanted for any such purpose they may be set to catch mosquitoes.

FIRE-HOLE RIVER, or main fork of Madison River. It flows from Madison Lake northwest through Fire-hole Basin, one of the most remarkable regions of the National Park, in the State of Wyoming.

FIRE ISLAND, a small island in Great South Bay, L. I., belonging to Suffolk county, N. Y. It is a favorite summer resort. Fire Island Beach, 30 miles long, with a fine light-house, separates Great South Bay from the Atlantic. Here incoming European vessels are sighted and the news telegraphed to New York city.

FIRELESS ENGINE, a successor to Dr. Émile Lamm's ammoniacal gas engine. The ammonia engine was successfully used in propelling street-cars in New Orleans in 1871, but was superseded by the incidental discovery, by Dr. Lamm, of a convenient method of using detached steam for the same purpose. The fireless engines, each towing one car, are charged with detached steam from stationary boilers, and run $5\frac{1}{2}$ miles in a half hour, working the pressure from 135 pounds to 60. They are very easily managed. The fireless engine now in use in New Orleans was patented in 1872. Similar locomotives are used in the suburbs of Paris, and at other points in France under the name of Lamm and Franqz System.

FIRELOCK, the name applied on its introduction, in 1690, to the old musket which produced fire by the concussion of flint and steel. Writers of the early part of the 18th century called firelocks 'asnaphans, a word obviously corrupted from the Dutch *snaphaan*. The weapon was superseded about 1830 by the percussion musket, which, in its turn, has yielded to the rifle.

FIRE-PROOFING, the treatment of combustible materials which renders them fire-proof. Attempts to render cotton, linen, and other textile fabrics, timber, etc., incombustible have to the present time been but partially successful. All that can be done to protect them is the prevention of conflagration; no process yet known can prevent smouldering. The best protection of textile fabrics is saturation with various salts, such as leave their crystals in the substance of the fabric. The most efficient protection to wood is silicate of soda. If planks of moderate thickness be brushed over several times on each side with a strong solution they will burn only on being subjected to intense heat. The protection is owing to the fusion of the silicate, which forms a glass enveloping the surface, thus sealing it from the oxygen of the air.

FIRE-SHIP, a vessel, usually an old one, filled with combustibles, sent in among the hostile squadron, and there fired, in the hope of destroying some of the ships, or at least producing great confusion.

FIRE-WEED, the popular name of several plants: the *Erechtites hieracifolia* of North America, often four or five feet high, very troublesome in and around spots where brushwood has been burned; the *Epilobium angustifolium* or *spicatum*, commonly called the great willow-herb, a tall perennial, bearing a spike of showy rose-purple

flowers; the *Erigeron Canadensis*, or common horse-weed, a troublesome weed, native to the United States, but widely naturalized in other countries; and the *Plantago media*, the English hoary plantain, or lamb's tongue, whose broad, low leaves stifle growing crops.

FIRKIN, a measure of capacity, generally the fourth part of a barrel. It is also a small wooden cask or barrel, used chiefly for butter, suet, tallow, etc.

FIRKOWITSCH, ABRAHAM, a Jewish archaeologist, born at Lutzk, in the Crimea, Sept. 27, 1786, died at Tshufut-Kale, in the Crimea, June 7, 1874. He was a Karaites, and devoted himself to collecting manuscripts and works in support of the teachings of the Karaites. He published accounts of his work in *Massa-u-Meriba* (1838) and in *Abne-Lik-karon* (1872). His large collection of manuscripts was purchased for the imperial library at St. Petersburg.

FIRLOT, an old Scotch dry measure, of which there were four in a boll; though differing in value for different substances and places, its relation to the boll remained invariable.

FIRMAMENT, a word formerly used to signify the vault of heaven. It was regarded as a solid crystal sphere to which the stars were fixed, and which was constantly revolving, carrying them with it. In the progress of astronomical observation it was found that many of the heavenly bodies had independent motions, inconsistent with the notion of their being fixed to one sphere or firmament. Then the number of crystalline spheres was increased, each body that was independent of the rest having one assigned to it. This introduced a complex system, fully understood only by the philosophers who formed the theory.

FIRMAN, a word of Persian origin, signifying an order, and used by the Turks to denote any official decree emanating from the Ottoman Porte. The right of signing any firman relating to affairs connected with his special department is exercised by every minister and member of the divan; but the office of placing at the head of the firman the *thograï*, a cipher which contains the name of the sultan in interlaced letters, and which alone gives effect to the decree, is committed to the hands of a special minister who is called *nichandji-effendi*. A written permission to trade is called in India a firman.

FIRST-BORN (Heb., *bekor*; Gr., *prototokos*; Lat., *primogenitus*): in Scriptural use, the first male offspring, whether of man or of other animals, due to the Creator, by the Mosaic law, as a recognition of his supreme dominion. The first-born male child being devoted from the time of birth to God, was to be redeemed within one month after birth by an offering not exceeding in value five shekels of silver (Exod. xiii, 13). The headship of the family was vested in the first-born son by the Mosaic law, and he had a double portion of the inheritance.

FIRST-FRUITs, that portion of the fruits of the earth which, by the use of the Jews and other ancient nations, was offered to God as an acknowledgment of His supreme dominion, and as a thanksgiving for his bounty.

FIRWOOL, a fibrous substance prepared to some extent from the leaves of various species of the genera *Pinus* and *Abies*, and made into cloth which is believed to be useful in the treatment of skin diseases. Fir-wool extract and fir-wool oil are prepared from leaves of the same species of fir.

FISCHER, ERNST KUNO BERTHOLD, a German philosopher, born in the Silesian village of Sandewalde, July 23, 1824, and educated at Posen, Leipzig, and Halle, taking his degree of Ph. D. at the latter place in 1847. In 1850 he established him-

self as a privatdocent of philosophy at Heidelberg, where he became exceedingly popular. Suddenly, however, in 1853, presumably because of private charges of pantheism made against the first volume of his *History of Modern Philosophy*, the Baden government, without explanation, deprived him of his position. In 1856 he received a call to the chair of philosophy at Jena, where he remained until 1872, in which year, Zeller having succeeded Trendelenburg at Berlin, he obtained Zeller's post at Heidelberg. Fischer's chief work is his great history of modern philosophy, *Geschichte der Neuern Philosophie* (1852-77). His other great philosophical achievement is his *System der Logik und Metaphysik* (1852; new ed., 1865). Of his smaller works the most noteworthy is a *Critique of Kant*, which, like *Descartes and His School*, has been translated into English.

FISH. See *Britannica*, Vol. XII, pp. 630-695.

FISH COMMISSION, a bureau of the United States government, which was established in 1871, for the purpose of promoting the fishing industries of the country by the propagation and distribution of useful fishes and by investigations with regard to their habits, fitness for food, etc. The Commission is carefully subdivided and has experts to take charge of the many different subjects submitted to them and make painstaking scientific research the basis of all practical work. Their efforts are greatly aided by State fish commissions which are established throughout the country.

FISH CULTURE. See *Britannica*, *PISCICULTURE*, Vol. XIX, pp. 126-129; also in these Revisions and Additions.

FISHERIES QUESTION, THE. Before the war of 1812 complaints had been made by British fishermen that the best places for drying and curing fish on the Canada coasts were occupied by United States fishermen, who were protected by the treaty of 1783. Article III of that treaty stipulated that fishermen of the United States should have the "right" to fish on the banks of Newfoundland and in the Gulf of St. Lawrence, and the "liberty" to take fish on all the coasts of British North America; also they were "to have the liberty to dry and cure fish in any of the unsettled bays, harbors and creeks of Nova Scotia, Magdalen Islands and Labrador." This treaty, the British government maintained, had been abrogated by the war of 1812; while the United States regarded it as a convention of separation dividing between the two countries property formerly held by them in common, to which their claim was at least equally strong, as the fisheries had been wrested from France and developed mainly by the colonists. The British government also contended that while the treaty of 1783 recognized the "right" to fish on the high seas it granted Americans only the "liberty" to fish on the coasts, and to dry and cure their fish in British waters. In 1818 a treaty was negotiated by which the United States "renounced forever" the liberty "to take, dry, or cure fish on or within three marine miles of" certain "coasts, bays, creeks, or harbors," while in other designated places they should enjoy that "liberty" "forever." The term "renounce" was insisted upon by the American negotiators, Albert Gallatin and Richard Rush, for three reasons: "To exclude the implication of the fisheries secured to us being a new grant; to place the rights secured and renounced on the same footing of permanence; that it might expressly appear that our renunciation was limited to three miles from the coast." It was also provided, with regard to the bays and harbors renounced, that "American fishermen shall be admitted to enter such bays or harbors for the

purpose of shelter, and of repairing damages therein, of purchasing wood and of obtaining water, and for no other purpose whatever. But they shall be under such restrictions as shall be necessary to prevent their taking, drying, or curing fish therein, or in any other manner abusing the privileges hereby reserved to them." Even this treaty, however, did not prevent trouble, and fishing vessels were frequently seized, and some were condemned, for infringing the three-mile limit. The Nova Scotians held that this three-mile measure should be taken from headland to headland and that American fishing vessels should not enter bays or harbors unless in actual distress. The "hovering act" was passed by the Nova Scotia legislature in 1836, and since by the Dominion of Canada, which forbade foreign vessels to linger within three marine miles of the coast; and strained relations existed between the nations until 1854, when a reciprocity treaty was concluded with the Dominion, under which peace and security came to the American fishermen, and the inshore fisheries were again thrown open to them. This treaty terminated in 1866, and a satisfactory system of licensing American fishing vessels was then instituted by the Canadian government.

In 1870, however, foreign fishermen were again excluded from Canadian waters, and immediately the old controversies as to headlands and trespass were renewed, until the treaty of Washington, concluded in 1871, provided in its fishery clauses for a free market in the United States for Canadian fish and for free fishing in Canadian waters for United States fishermen, and amicable relations were once more restored. Salmon and shad fisheries, and all other in the mouths of rivers, were reserved for British subjects, and certain "places reserved from the common right of fishing" in the treaty of 1854 were excepted from the operation of the treaty of Washington, and a commission was appointed to decide what, if any, compensation should be made to the Canadians for the privileges secured by the treaty to the American fishermen. This commission sat at Halifax in 1877, and decided that the advantages to the United States were of greater value than those conceded to the Canadians, and the sum of \$5,500,000 was awarded to the British government.

This treaty of Washington was terminable after eleven years by either party giving two years' notice, and such notice was given in 1883 by the United States Government, in accordance with a resolution to that effect adopted by Congress. A *modus vivendi* was negotiated between the British minister and Secretary Bayard, by which the inshore fishing privileges were continued to the American fishermen until the end of the season of 1885, in consideration of the President's suggesting in his message to Congress the creation of a commission "to consider the general question of our rights in the fisheries and the means of opening up to our citizens, under just and enduring conditions, the richly stocked fishing waters and sealing grounds of British North America." The terms used were thought to point toward the adoption of reciprocity; and Mr. Maybury, of Michigan, introduced a proposal in the House of Representatives requesting that the President open negotiations for a renewal of the treaty of 1854, but no action was taken. The President's recommendation was rejected by the Senate, on the ground that the treaty of 1818 was all that was required. But disputes were constantly arising as to the construction of the terms of this treaty. Canada claimed under it that any American fishing vessel found in Canadian waters for any purpose but repairs, shel-

ter, food or water was forfeited. This claim was denied by the United States, and a considerable party there were in favor of retaliation for annoyances caused by this view of the treaty. A "responsive" measure was suggested, authorizing the President at his discretion to close our ports to Canadian vessels, and prohibit the importation of Canadian merchandise. Eventually a conference was arranged, to be held at Washington, at which all vexed questions should be discussed, and if possible some amicable and lasting conclusion arrived at with regard to outlines and boundaries, modes of preventing unjust seizure and detention of vessels, the question of obtaining bait and supplies, and also the question of payment of damages resulting from wrongful acts of officials. The members of this conference were Sir Charles Tupper, Canadian plenipotentiary, the Right Honorable Joseph Chamberlain, M. P., British commissioner, and Sir Lionel West, representing British views, and with Secretary Bayard, Messrs. William L. Putnam, of Maine, and President James B. Angell, of Michigan University, were associated to guard American interests. The conference was opened in Washington in November, 1887, and on February 15, 1888, a treaty was signed, subject to ratification or rejection by the United States Senate within two years. It was rejected by that body on Aug. 21, 1888.

For an account of the Bering Sea fisheries question, see SEALS and SEAL FISHERIES, in these *Revisions and Additions*, also *BERING SEA*.

FISH: in naval terms, an apparatus of pulleys employed in dragging the flukes of the anchor towards the bow after it has been hoisted to the cat-head. *Fish-front* is a long piece of oak, or fir, convex without, concave within, securely fastened on the injured portion of a sprung mast or yard, to which it imparts rigidity.

FISH CULTURE. See *Britannica*, Vol. XIX, p. 126.

FISHERMAN'S RING (*Annulus piscatorius*), a seal-ring bearing the device of St. Peter fishing, and worn by the popes as St. Peter's successors. It has been employed since the 13th century, and is used to seal certain briefs. The origin of the custom is not known.

FISH-HAWK. See *OSPREY*, *Britannica*, Vol. XVIII, p. 56.

FISH, HAMILTON, an American statesman, born in 1808. He was admitted to the bar in 1830, and for several years was a commissioner of deeds. In 1842 he was chosen a representative in Congress. In 1847 he was elected lieutenant-governor of New York, and in 1848 became governor. In 1851 he was chosen United States Senator, and in 1869 was appointed Secretary of State by President Grant. In 1873 he was reappointed, serving through Grant's administration.

FISH, NICHOLAS (1758-1833), an American soldier. In 1776 became aid-de-camp to Gen. Scott; the same year major of brigade, and then major of the 2d New York regiment. At the close of the war he was a lieutenant-colonel, and in 1786 became adjutant-general of New York State, holding the office for many years. In 1794 he was supervisor of revenue under Washington, and in 1806-17 was a New York alderman.

FISHER, GEORGE JACKSON, an American physician, born in 1825. He began practice in 1849, and in 1853-54 was physician and surgeon to the New York State-prison at Sing Sing. For twenty years he was United States examining surgeon, and in 1874 was president of the State Medical Society. He wrote many works on anatomy, surgery, and medicine.

FISHER, GEORGE PARK, an American theologian, born in 1827. He studied theology in the United States and Germany, was called to the professorship of divinity in Yale, and from 1854 to 1861 was pastor of the college church. In the latter year he was chosen professor of ecclesiastical history in Yale Divinity School. In 1866 he became one of the editors of the "New Englander." He is the author of numerous works on ecclesiastical topics.

FISHES, ROYAL. The sturgeon or whale, when thrown on the shore or caught near the coast, are, in British law, the property of the crown. See *Britannica*, Vol. IX, p. 268.

FISH-LOUSE, a name applied to any of the Copepod crustaceans which occur as external parasites both on fresh-water and marine fishes. Some have also been found on amphibians. To the zoölogist they have a special interest on account of the degeneration which they often exhibit, when contrasted with their free-living relatives, or even with their own young stages.

FISK, or *Fisco*, a term found in Scottish law books. It is derived from the Latin *fiscus*; literally, a wicker basket, which came ultimately to signify the private purse of the emperor, and distinguished from the public treasury, which was called *ararium*. In Scotland it usually signifies the crown's revenues, to which the movable estate of a person denounced a rebel was formerly forfeited.

FISK, CLINTON BOWEN, an American general, born at York, N. Y., in 1828, died in 1890. In 1830 he was taken to Michigan, where his father founded the town of Clinton. He was educated at Albion and Ann Arbor, and afterwards settled in business at Coldwater. He entered the army in 1861, and rose rapidly to the rank of brevet major-general. After the war he was a commissioner of the Freedman's Bureau, and founder of Fisk University. From 1874 until his death he was president of the Indian Commission. He was prominently connected with many educational and religious institutions. In 1888 he was the candidate of the Prohibition party for President of the United States.

FISK, WILBUR (1792-1839), an American clergyman and educator. He was licensed to preach in the Methodist Episcopal church in 1818; in 1822 was ordained deacon, and from 1823 to 1827 was presiding elder of that part of Vermont east of the Green Mountains. In 1826 he was chaplain of the Vermont legislature, and from 1826 to 1831 was principal of the Wesleyan Academy in Wilbraham, Mass. In 1830 he was elected the first president of Wesleyan University. In 1836 he was in England and represented the M. E. church at the Wesleyan conference, and in 1839 he became a member of the board of education of Connecticut. His publications are principally theological and educational works.

FISKE, JOHN, an American author, born in 1842. In 1864 he was admitted to the Connecticut bar, but never practiced. From 1869 to 1871 he was lecturer on philosophy at Harvard; was instructor in history in 1870, and from 1872 to 1879 was assistant librarian. In 1879, and again in 1885, he was chosen a member of the board of overseers. Since 1884 he has been professor of history in Washington University, St. Louis, Mo. His works are principally on history, and on the doctrine of evolution.

FISSIROSTRES, one of the classes of birds into which the great order *Insectores* is divided. It is characterized by peculiar width of gape, and the bill is depressed or horizontally flattened, short,

and often furnished with strong bristles at the angles. The birds of this tribe are insectivorous, and generally subsist by catching insects on the wing, to which their structure of bill is beautifully adapted. Their powers of flight are generally great, but their legs are short and weak. Swallows, goat-suckers, etc., are examples of this order.

FISTULINA, a genus of fungi, allied to *Boletus*, common on old oak and various other trees. Its color is red, its substance fibrous and fleshy, much resembling beet-root. This fungus is much esteemed in some parts of Europe and America, as an esculent; it is wholesome and nutritious.

FITCH, ASA (1809-1879), an American naturalist. For a time he practiced medicine, but from 1838 devoted himself entirely to scientific agriculture and the study of natural history. In 1854 he was made New York State entomologist.

FITCHBURG, a city of Massachusetts, and county-seat of Worcester county (see *Britannica*, Vol. IX, p. 270). The growth of the city during the last decade has been considerable. A well-equipped fire department has been established, with 60 telegraphic fire-alarm stations. There were in 1890 12 churches and 24 school buildings, the latter being valued at \$275,000. A public library and art gallery building, costing \$90,000, has been donated to the city by one of its public spirited citizens, and another has given \$450,000 for the establishment and endowment of a public hospital. The library contains 22,310 volumes. Manufacturing is carried on extensively, the principal establishments being paper mills, machine shops, iron foundries, saw factories, cotton, woolen, and flour mills, shoe factories, wood-turning establishments, and shirt factories. Population in 1880, 12,429; in 1890, 22,037.

FITCHY. Crosses are said to be fitchy in heraldry when the lower branch ends in a sharp point. Crosses are supposed to have been so sharpened to enable the primitive Christians to stick them into the ground for devotional purposes.

FITZ, an old Norman word signifying "son," like the Scotch *Mac*, the Irish *O'*, and the Oriental *Ben*. It is prefixed to proper names to signify descent; as in the Norman names Fitzwilliam, Fitzwalter, etc. A later application of it has been to denote the natural sons of royalty, as in Fitzroy, Fitzjames, etc. The Russian termination *witch* is a Slavonic form of the same word.

FIVE FORKS, a locality in Dinwiddie county, Va., where an important battle was fought April 1, 1865, between Confederate troops and the army under Gen. Sheridan. The Union forces were victorious.

FIVE ISLANDS, a village of Colchester county, N. S., on the Basin of Minas. It possesses much mineral wealth; a remarkable cataract 90 feet high; manufactures baryta paint, and builds ships.

FIXING, in Photography. When a picture has been obtained through the agency of light, by the exposure of a sensitive surface suitably prepared, and the subsequent development of the latent image, there remains in the deepest shadows of the picture a portion of the sensitive material, unacted upon by light. The removal of this unaltered sensitive material by an appropriate solvent is termed fixing, though the term clearing would perhaps be preferable, fixing being more strictly accurate in the case of the daguerreotype process, where the picture is fixed to the silver-plate by the deposition of a film of metallic gold.

FLACOURTIACEÆ, a natural order of exogenous plants, allied to Passion Flowers, and consisting of shrubs and small trees, almost exclusively confined to the tropical regions. Many of

the species produce pleasant, sweet, or subacid fruits. Arnott is produced by a tree of this order.

FLAG, THE AMERICAN. Prior to the separation of the American colonies from England, the flags used were generally those of the mother country; but in 1774 Captain Markoe, of the Philadelphia Light Horse, used a flag with a canton of 13 stripes. In the latter part of 1775 Dr. Franklin and Messrs. Lynch and Harrison were appointed to consider the subject of a National flag. The result of this conference was a flag like that of the East India Company and the Sandwich Islands—the King's colors or Union Jack, representing the yet recognized sovereignty of England, with a field of 13 stripes, alternate red and white, emblematic of the union of the 13 colonies. The new flag was hoisted for the first time, Jan. 2, 1776, over the camp at Cambridge. When Independence was determined on, the British Jack was dropped, and thirteen stars substituted, representing a new constellation. Nothing further of importance was done on the question of a National flag until April 4, 1817, when Congress enacted: (1) That from and after the 4th of July, 1818, the flag of the United States be 13 horizontal stripes, alternate red and white; that the union be 20 stars, white in a blue field. (2) That on the admission of every new State in the Union, one star be added to the union of the flag; and that such addition shall take effect on the 4th day of July then next succeeding such admission. The first flag unfurled under the new law was hoisted over the United States House of Representatives, April 14, 1818. The law of 1817 remains unchanged to the present day, and hence the national flag is now composed of 13 horizontal stripes, alternate red and white, and a cluster of 44 white stars on a blue background.

FLAG, a genus of plants. See *Britannica*, Vol. IX, pp. 279-80.

FLAG-CAPTAIN, in the navy, the captain of the admiral's ship in any squadron, and ordinarily his nominee.

FLAG-LIEUTENANT, an officer who, in the navy, performs such duties for an admiral as would devolve upon an aid-de-camp in the army. He communicates the admiral's orders to the various ships, either personally or by signal.

FLAGEOLET-TONES, a name given to the harmonic notes of the violin, violoncello, and other stringed instruments, which notes are produced by the finger lightly touching the string on the exact part which generates the harmony. The string vibrates on both sides of the finger, the long side dividing itself into parts of the same length as the short side.

FLAGET, BENEDICT JOSEPH (1763-1850), a French-American R. C. bishop. He was ordained priest in 1788, and in 1792 came to the United States. He was at once sent as chaplain to Vincennes, Ind., then a military post in the Northwest. From 1795 to 1798 he was a professor at Georgetown College, and for the next three years was in Havana as a tutor to the sons of a wealthy Cuban. From 1801 to 1808 he was engaged in duties at Georgetown College and in missionary labors, and in the latter year was appointed bishop of Bardstown, Ky. During his life he erected numerous colleges and convents, some of which were built at his own expense.

FLAGG, GEORGE WHITING, an American artist, born in 1816. He studied in the United States, then spent several years in Europe, and subsequently settled in New York city. His productions comprise historical and genre pictures, and some portraits, all of which have been favorably received.

FLAGG, JARED BRADLEY, an American artist, brother of George Whiting Flagg, born in 1820. He settled in New York city, and pursued the study of theology in connection with that of art, and in 1854 entered the ministry of the Protestant Episcopal church. For ten years he devoted himself to ministerial duties, and then gave himself up to painting. He produces some ideal figure-pictures, but makes a specialty of portraits.

FLAGG, WILSON (1805-84), an American naturalist. For a time he wrote for the "Boston Weekly Magazine" and the "Boston Post" on political subjects, and then turned his attention to the agricultural journals. From 1844 to 1848 he was employed in the Boston custom-house. In 1856 he settled in Cambridge, Mass., and resided there until his death. He was the author of many valuable works on natural history.

FLAG OF THE PROPHET, the sacred banner of the Mohammedans. It was originally white, and was composed of the turbans of the Koreish captured by Mohammed. A black flag was, however, soon substituted in its place, consisting of the curtain that hung before the door of Ayesha, one of the prophet's wives. This flag is regarded by the Mohammedans as their most sacred relic.

FLAGS, pieces of thin, light material, usually bunting, of various colors, shapes and sizes, and sometimes with elaborate and curious designs, hoisted in conspicuous places and hanging free from poles or flag-staffs, capable of being extended by the wind, and designed to make known some fact or want to the spectators. For a history of what may be called the evolution of the modern standard or ensign, see *Britannica*, Vol. IX, pp. 276-279.

OBJECT AND USES OF A FLAG.—The primary object of a flag is to denote nationality. This is its principal use at sea, in order that the commander of a vessel may show to what country his ship belongs, "under what flag it sails." It is displayed—not on the mast-head, however, that position being reserved for the flag of the country to which the vessel is bound, or for other signal—but at the gaff, and its position shows the state of affairs on board: if it be at half mast a death has occurred; if it be reversed, assistance is needed. When saluting, it is "dipped"—lowered and hoisted again—in token of respect, and it is "struck," or lowered permanently in token of surrender. Besides the national flag, flags of one color are used with one meaning all the world over: a white flag being the emblem of peace or a truce, a black flag of a pirate, and a yellow flag of dangerous sickness or quarantine. Flags of different shapes and of varied devices are also used in combinations, guided by a formulated code, which make extended communications practicable with a limited number of flags. On land their use is, of course, of a different character. In military use the terms differ for the various signal flags, and generally show their French origin.

THE GOVERNMENTAL FLAGS OF THE UNITED STATES are the standard, the pennant, the revenue service flag, the President's flag, and the flags of rank in the navy. The pennant, or whip, is a long strip of bunting which flies at the mast-head of a ship in commission. The custom-house flag displays the shield, the stars, the eagle, and the stripes—all the national emblems. The jack shows the "union" only. It is hoisted on the bowsprit cap in port, and when at the fore means that a pilot is wanted. Ships, which in an emergency, may be put in commission by the Government, fly the flag of the naval reserve. "Blue Peter"—a name which is a corruption of "blue repeater"—is hoisted by a British vessel which is ready for sea. It recalls

officers and seamen who may be on shore or off in boats, and implies that a pilot or perhaps more seamen are needed, though the Union Jack is the pilot flag, as with ourselves.

FLAGS OF RANK IN THE NAVY.—Of the flags of rank in the United States navy those of admiral and vice-admiral will not be required unless the offices are recreated by Congress, rear-admiral being now the highest grade in the United States navy. In 1862 the grade of rear-admiral was created, in 1864 that of vice-admiral, and in 1866 that of admiral, in recognition of the services to the Government rendered by Farragut. When he died, in 1870, the rank was conferred on Vice-Admiral Porter, and it died with him; just as the rank of general became extinct with the deaths of Grant, Sheridan, and Sherman. The President's flag is carried at the main of a ship of war which carries the President, and at the bow of his barge when he is on board.

NATIONAL STANDARDS.—A national standard is usually the result of circumstances or the embodiment of ideas that arouse the enthusiasm of those to whom it belongs, so that they will perform deeds of valor, imperiling life itself in its defense and in defense of the principles it represents. This has been shown in the history of nearly every country and every people in the world, but not every one can sympathize with the fanaticism said to be excited by the exhibition of the standard of Islamism, the "flag of the prophet," to his followers when it is thought they require such excitement at the beginning of or during a war. With the progress of improvements in the art of war, and in making weapons and ornaments, the extension of civilization, and the tendency to settle international difficulties by arbitration before instead of after hostilities, the use of flags as war signals bids fair soon to become matter of history. Still this has been one of their chief uses in the past, and is one of the causes of the veneration or dislike, as the case may be, with which they are regarded. The heraldic devices borne on some of them, grotesque as they seem at the first glance, convey a history of triumph to some and to others a record of defeat and subjugation. In other cases the combination of armorial bearings shows where amicable alliances have been made, while others bear no device, as that of Morocco, which is a plain red flag; and "the flag of the prophet," to which allusion has been made, is black, and was originally the curtain of a tent. One of the most striking of national ensigns is the British, on which the arms of England, Scotland, and Ireland are quartered. On the flags of those countries where Mohammedanism prevails, a crescent is displayed, as those of Christian nations show a cross. The national flag of Mexico shows an eagle with a snake in his beak. The national emblem of China, the dragon, is shown blue on a yellow flag. Flags of this nation vary according to fancy, but always have fringed or scalloped edges. The lion appears on the Persian standard, in front of the rising sun; the elephant on that of Siam, and eagles, armed and unarmed, double and single-headed, crowned and uncrowned, with globes and crosses and other insignia inherited from past ages, appear on those of Russia and Germany. Such ensigns fly over the residences, temporary or permanent, of reigning sovereigns or of members of the royal families, afloat or ashore.

Changes in governments, if radical, cause changes in the national emblems, the lilies having disappeared from the French as the Bourbons from French politics, and the keys of St. Peter from the Italian with the unification of Italy, and the

disappearance from the political map of the States of the church. In our own flag it is provided by law that an additional star be added for each State admitted to the Union—the number of stripes remaining unchanged to show from what it has grown. In the years 1889-90 six States were admitted, making 44 the number of stars required in the national flag of the United States.

SIGNAL-SERVICE FLAGS.—The meteorological department of the signal service has a suit of flags for each of its three divisions: cautionary, storm, and weather signals. These are displayed at necessary or appropriate stations on the sea-board or in the agricultural districts, and form a very useful and popular branch of the service. A Weather Bureau was created in the Department of Agriculture by act of Congress in 1880, and the meteorological duties formerly devolving upon the United States Signal Service were transferred to it in 1891 from the War Department, of which it had since its adoption in 1870 been an adjunct.

FLAG-SHIP, the ship in a fleet which bears the admiral's flag, and therefore forms a sort of center to which all other vessels must look for orders. It is usually the largest vessel in the fleet.

FLAGSTONE, a rock which splits into tabular masses, or flags of various size and thickness, in the original planes of stratification. Flagstones are generally sandstones combined with more or less argillaceous or calcareous matter; some, however, are indurated clays, and others thin-bedded limestone.

FLAMBOROUGH HEAD, a promontory of the Yorkshire coast, forming the northern boundary of Bridlington Bay. It terminates a range of white perpendicular chalk cliffs 6 miles long, containing fossil sponges, crinoids, etc. On the head is a light-house 214 ft. high.

FLAMINGO. See *Britannica*, Vol. IX, p. 286.

FLAMINIAN WAY (*Via Flaminia*), the great northern road of ancient Italy, leading from Rome to Ariminum (Rimini) on the Adriatic. It was constructed by C. Flaminius during his censorship (220 B. C.), in order to secure a free communication with the recently conquered Gaulish territory. When Augustus (27 B. C.) appointed persons of consular dignity road-surveyors for the other highways of his dominions he reserved the care of the Flaminian Way for himself, and renewed it throughout its whole length.

FLAMMARION, CAMILLE, a French astronomer, born at Montigny-le-Roi, Feb. 25, 1842; entered the Paris Observatory in 1858, and became a popular lecturer on astronomy. Retiring in 1865, he devoted himself to the popularization of science in periodicals and books. His principal publications are: *The Plurality of Inhabited Worlds* (1862; 30th ed. 1884); *Imaginary Worlds and Real Worlds* (1864; 19th ed. 1884); *God in Nature* (1866; 18th ed. 1882); *Celestial Marvels* (1865); *Studies and Lectures on Astronomy* (1866-81; 9 vols.); *History of the Heavens* (1872); *The Atmosphere* (1872); *The Stars and the Curiosities of the Heavens* (1881); and *The Lands of the Heavens* (8th ed. 1882). Flammarion made many balloon ascensions for the study of aerial phenomena, and published a work entitled *Travels in the Air*. In 1892 M. Flammarion took a deep interest in the observations of the planet Mars and was among those who held that communication between the earth and our nearest celestial neighbors is not impossible.

FLANDERS, HENRY, an American lawyer, born in 1826. He studied law with his father, Charles Flanders, and in 1850 settled in Philadelphia, where he has since resided. He is the author of several well-known treatises on various kinds of law.

FLANGE, a rim or projection upon a tube or cylinder of metal or other material, to serve as a bearing or afford means of fixing it; for example, the projecting rim on the tires of the wheels of railway-cars is called a flange.

FLAT, a musical character, which, when placed before a note, lowers that note half a tone. When placed at the beginning of a piece of music it denotes that all the notes on the line or space on which it is placed, with their octaves above and below, are to be played flat.

FLATTERY, CAPE, a promontory on the east coast of Australia, in latitude 14° 52' south, and longitude 154° 20' east. It is about thirty miles to the north of Endeavor Bay.

FLAUBERT, GUSTAVE, born at Rouen, France, December 12, 1821; died May 9, 1880. He belonged to the realistic school of novelists, and is well known in America by his *Madame Bovary* and *Salammbô*, which have been translated and extensively circulated.

FLEABANE, a genus of plants of the natural order *Compositæ*, sub-order *Corymbifera*, having hemispherical imbricated involucre and yellow flowers, the whole plant emitting a peculiar aromatic smell, sometimes compared to that of soap, which is said to be efficacious in driving away fleas. It has considerable reputation for medicinal purposes.

FLEAWORT, the *Plantago Psyllium*, a kind of plantain of Europe and Barbary. The seeds, *Semen psyllii*, are mucilaginous, and are sometimes used for the same purposes as flax-seed.

FLECHE, LA, a town of France, in the department of Sarthe, on the Loire. On an island in the Loire, which separates the town from its suburbs, are the remains of an ancient castle. It has manufactures of leather, paper, gloves, linen and hosiery. Population, 7,468.

FLEET PRISON, a celebrated London jail, which was the king's prison as far back as the 12th century. In the 16th century it acquired a high historical interest as the prison of the religious martyrs of the reigns of Mary and Elizabeth. The buildings were demolished in 1845-46, and part of the site is now occupied by the Congregational Memorial Hall.

FLEMING, SANDFORD, Canadian engineer, was born in Scotland, Jan. 7, 1827. He removed to Canada in 1845, and in 1852 was on the engineering staff of the Northern Railway, and afterwards one of the chief promoters of the railway from the Atlantic to the Pacific. The first link in this chain was formed by the Inter-Colonial Railway, undertaken by Mr. Fleming at the request of the governments of Canada, Nova Scotia and New Brunswick, in conjunction with the Imperial authorities. July, 1876, saw the completion of this great work, an historical account of which Mr. Fleming published in the same year. While the "Inter-Colonial" was being constructed Mr. Fleming was ordered to survey and locate the line for the Pacific Railway, a task which he partly accomplished in 1872. For the next seven years he actively prosecuted that enterprise, and for his services was knighted in 1877. In 1880 he was elected Chancellor of Queen's University, Kingston, Ontario, a position to which he has thrice been re-elected since, and which he still holds. In 1884 he represented the Dominion at the International Prime Meridian Conference at Washington.

FLEMINGSBURG, the county-seat of Fleming county, Ky. It has a college, distilleries, Masonic and Odd Fellows' Hall. Population, 1,172.

FLEMINGTON, a railroad junction of New Jersey, and county-seat of Hunterdon county, situated

in a rich agricultural district 50 miles southwest of New York city.

FLEMINGTON, a village of Taylor county, in the northeastern part of West Virginia. Here is the West Virginia College (Free-will Baptist).

FLESH-FLY (*Musca vomitoria*), an insect of the same genus as the house-fly, which it much exceeds in size. The forehead is rust colored, the thorax grayish, the abdomen blue with three black bands; the expanse of wings nearly one inch. It deposits its eggs on flesh; the maggots are of very frequent occurrence on meat in summer, notwithstanding all care that can be taken. There are several allied species.

FLETCHER, ALFRED, an English journalist, born at Long Sutton in 1841, and educated at Manchester and Edinburgh. He edited the "Cyclopædia of Education," and has been connected as correspondent with several prominent periodicals. In 1878 he joined the staff of the London "Daily Chronicle," and in 1890 became its editor.

FLETA, the title of an early treatise on the law of England, presumably written about 1290 by a judge who was confined in the Fleet Prison.

FLETCHER, JOHN, originally *De la Fléchière*, born at Nyon, Switzerland, Sept. 12, 1729, died Aug. 14, 1785. He was educated at the University of Geneva, and at the age of 23 went to London to perfect his knowledge of the English language. He was ordained a minister of the Established Church in 1757, and became an able coadjutor of the Wesleys. In 1760 he settled as vicar of Madeley, and in 1771 the Countess of Huntingdon appointed him president of her theological school at Trevecca, Wales. The latter position Mr. Fletcher resigned upon being required to disavow Wesley's views, and published his well-known *Checks to Antinomianism*. After three years spent in Switzerland in pursuit of health, he returned to England and devoted himself to his work until his death. He was one of the founders of Methodism, and a man of great industry and piety. His writings are published in four volumes.

FLEURUS, a small town of Belgium in the province of Hainaut, situated north of the left bank of the Sambre, and 15 miles west of Namur. It has been the scene of several contests. Population, 2,300.

FLEURY, FLOWRY, FLEURETTE, ETC., in heraldry, signifies that the object is adorned with fleurs-de-lis. A cross-fleury, for example, is a cross whose ends are in the form of fleurs-de-lis.

FLEURY, EMILE FELIX, a French general, born in Paris, Dec. 23, 1815, died Dec. 12, 1884. He was educated at the Collège Rollin, entered the army in 1837, served in eleven campaigns in Algeria, and by his gallantry obtained rapid promotion. Returning to France in 1848, he served the Bonapartist cause, became an officer of the Legion of Honor in 1849 and grand officer in 1859, and was summoned to the French Senate in 1865. In 1866 he was sent on a diplomatic mission to Italy, and in 1869 became ambassador at St. Petersburg. On the downfall of Napoleon III in 1870, he retired to Switzerland. He was placed on the retired list of the army in 1879.

FLEXURE, or FLEXION, the bending or curving of a line or figure. A curve is said to have a point of *contrary* flexure at the point where it changes its character of concavity or convexity towards a given line.

FLINDERSIA, a genus of trees of the natural order *Cedrelaceæ*, an Australian species. Yields timber which is little inferior to mahogany.

FLINT, a city of Michigan, and county-seat of Genesee county, 60 miles northwest of Detroit. It

has a State institution for the deaf, dumb and blind, and steam saw mills where 50,000,000 feet of lumber are sawed annually. Pop., 9,803.

FLINT, AUSTIN (1812-86), an American physician. His professional career began in 1833; he practiced in Boston, Mass., and then in Buffalo, N. Y. In 1844-45 he was a professor at the Rush Medical College in Chicago, Ill., and from 1847, for six years, in the Buffalo Medical College. From 1852 to 1856 he was a professor in the Louisville University; in 1856 in the Buffalo Medical College; in 1858 in the New Orleans School of Medicine; in 1861 in the Long Island College Hospital, and from 1863 until his death was professor of the principles and practice of medicine in the Bellevue Hospital Medical College. He was consulting physician to various hospitals, and from 1872 to 1885 was president of the New York Academy of Medicine. He was a member of many medical and scientific bodies both in America and Europe, and was present at several important medical congresses as a delegate. His contributions to medical literature were numerous.

FLINT, AUSTIN, an American physician, son of the preceding, born in 1836. He began to practice medicine in Buffalo in 1857, and in the following year became an attending surgeon in the Buffalo city hospital, and a professor in the Medical College. In 1859 he was chosen professor of physiology in the New York Medical College, and in 1860 to a similar chair in the New Orleans School of Medicine. In 1861 he became professor of physiology and microscopic anatomy in the Bellevue Hospital Medical College, and for eight years lectured in the Long Island College Hospital. In 1874 he became surgeon-general of New York State. He has written several works on physiological topics.

FLINT RIVER, in Michigan, rises in Lapeer county, flows west and northwest and unites with the Shiawassee to form the Saginaw River. It is about 100 miles in length.

FLINT RIVER rises in Clayton county, Ga., and flows by an irregular course to the southwest corner of the State, where it unites with the Chattahoochee to form the Appalachian River. It is about 300 miles in length, and is navigable by light-draught steamers as far as Albany, nearly 150 miles from its mouth.

FLOATING-BATTERY, a hulk heavily armed and made as invulnerable as possible, formerly used in defending harbors, or in attacks on marine fortresses. Floating batteries are interesting as a stage in the development of the modern iron-clad.

FLOATING-ISLANDS, the formations caused either by the aggregation of driftwood in the creeks and bays of tropical rivers and the deposition thereon of soil and vegetable matter, or by the detachment of portions of a river-bank or lake-shore, on which the interlacing roots of plants constitute a foundation sufficiently strong to support soil whereon herbage, and occasionally even trees, are able to grow. Floating islands are sometimes seen 50 or 100 miles distant from the mouth of the large rivers of America, Asia, and Africa.

FLOATING WAREHOUSES, places of storage constructed, chiefly in French ports, for the reception of gunpowder, nitro-glycerine, petroleum, and other dangerous wares, and anchored where they are not liable to be fired and in case of explosion can do little damage to other property. Each warehouse consists essentially of 100 hollow iron cylinders, arranged in four rows of twenty-five each, firmly lashed or strapped together to form a kind of raft. Each cylinder, sixteen feet long by six or seven in diameter, has a man-hole at one end by

means of which it is filled. They are placed upright when in position.

FLOATSTONE, a variety of quartz, consisting of fibers—delicate crystals—aggregated so that the whole mass is sponge-like, and so light, owing to the air confined in the interstices, that it floats for a while on water. It is found in a limestone of the chalk formation near Paris, in imbedded masses, or incrusting flint nodules.

FLOBECQ, a small town of Belgium, in the province of Hainault, 20 miles northeast of Tournai. It has extensive manufactories of linens, has breweries, salt works, oil and flour mills. Population, 6,250.

FLOGGING, a mode of corporal punishment, which, in deference to public opinion, was abolished in 1881, and which had existed from time immemorial in the British army and navy. It was often inflicted upon slight occasion, and with barbarous severity.

FLOQUET, CHARLES, a French statesman, born in the Lower Pyrenees in 1828, and called to the Paris bar in 1851. After the fall of the empire he was deputy mayor and member of the National assembly, but having resigned during the commune, he was suspected of disloyalty and interned at Pau until 1872. He subsequently held various offices; was twice vice-president of the Chamber, and was president of the Brisson cabinet. He formed a ministry on the resignation of the Tirard cabinet, and was president of the council and minister of the interior. He wounded General Boulanger in a duel fought in 1888. Having introduced a bill for the revision of the French Senate, the ensuing debate resulted in the defeat of his ministry, and he resigned in 1889. Later he became finance minister, but in 1892 resigned under charges.

FLOREAL (the "flowery"), the eighth month of the year in the calendar of the first French Republic, which, from Nov. 24, 1793, to Sept. 9, 1805, was used in place of the Gregorian. It commenced April 20th and ended May 20th.

FLORENCE, the county-seat of Lauderdale county, Ala., situated at the head of navigation on the Tennessee River. Here is a State normal school, female college, and in the vicinity several cotton factories. Pop. (1890), 6,012.

FLORENCE, a city of Marion county, Kan., situated at the confluence of the Cottonwood River and Doyle Creek. Pop., 1,229.

FLORENCE, a village of Hampshire county, Mass., 3 miles northwest of Northampton. It has establishments where sewing-machines, silk, cotton and woolen goods are manufactured. Pop., 2,789.

FLORENCE, a railroad junction of Darlington county, S. C. It has railroad shops, machine shops, and a population of 3,395.

FLORENCE, the county-seat of Florence county, Wis., located in the vicinity of iron-ore mines. The lumber trade and iron business are the sources of prosperity in the town. Pop., 500.

FLORENTINE WORK, or **PIETRA DURA**, a kind of ornamental work composed of black or white marble inlaid with hard stones, such as agates and jaspers. Although Florence is the most famous seat of this art, the Russians produce finer work than the Italians.

FLORET, a term applied to the flowers of any small and closely crowded inflorescence which resembles at first sight a single flower.

FLORICULTURE. While floriculture has been carried on as a business in the United States for more than one hundred years, its extent was not of large proportions until during the last score of years. It was not made a subject of official census investigation until 1890. According to the Government report, bearing date at the Census Office

April 21, 1891, the recent growth of the business has been very remarkable.

Floral establishments were found in every State except Idaho, Nevada, Indian Territory, and Oklahoma. In the United States there were 4,659 floral establishments, 312 of which were owned and conducted by women. Of the total number of establishments 2,795 were started between 1870 and 1890, and of these 1,797 between 1880 and 1890. These 4,659 establishments had in use in the census year 38,823,247 square feet of glass, covering a space of more than 891 acres of ground. The establishments, including fixtures and heating apparatus, were valued at \$38,355,722.43; tools and implements, \$1,587,693.93, and gave employment to 16,847 men and 1,958 women, who earned in the year \$8,483,657. Fuel for heating cost \$1,160,152.66. The products for the year were 49,056,253 rose bushes, 38,380,872 hardy plants and shrubs, while all other plants amounted to 152,835,292, reaching a total value of \$12,036,477.76 for plants. Cut flowers brought an additional income of \$14,175,323.01.

From the census report it appears that the largest number of square feet of glass in one establishment in the United States is in the District of Columbia; the oldest establishment was started in New York; the largest number of roses propagated were, respectively, in Pennsylvania, Illinois, and Ohio; the largest number of hardy plants propagated were, respectively, in Illinois, New York, and Kansas; the largest total value of plant sales were, respectively, in New York, Pennsylvania, and California, and the largest total value of cut-flower sales were, respectively, in New York, Illinois and Pennsylvania.

In addition to the Society of American Florists, 965 State and local floral societies and clubs and 358 horticultural societies, aided by the agricultural and horticultural press helped to develop this industry to its present large proportions.

The table on page 693 shows, by States, the number of florists' establishments, number owned by women, largest and smallest green house in each State, total square feet of glass, area of land cultivated, value of tools and implements, and total value of establishments. New Jersey, situated as it is between the New York and Philadelphia city markets, makes the largest showing of any State in the Union in proportion to its size.

The statistics given were obtained direct from the florists themselves in answer to questions sent them on special schedules, by personal visitation, and by the combined efforts of some of the florists' clubs. The California State Floral Society went so far as to aid in the good work by appointing a special committee and making a careful canvass of the whole State, and the Census Office investigations fully corroborate the thoroughness of their work.

FLORIDA, STATE OF (see *Britannica*, Vol. IX, pp. 338-41). Florida extends the farthest south of all the Southern States, and has more sea-coast (over 1,200 miles) than any other State in the Union. The larger part of the State is a peninsula 350 miles long, and about 100 miles wide, forming one of the principal outlying barriers of the Gulf of Mexico. Near the coast the surface rises only from 10 to 100 feet, but the interior is higher, and somewhat more undulating. Owing to its proximity to the tropics, and the presence of the sea on all sides, extremes of temperature are unknown, and the State has long been the favorite winter resort of Northern pleasure seekers and invalids. The hot, moist climate admirably adapts it to agriculture, stock-raising and fruit-growing. The Everglades, a vast, marshy lagoon in the southern part of the State, comprise an area of about 4,000 square

Divisions and States.	Total Estab-lish-ments.	Owmed and managed by women.	Largest num-ber of sq. feet in one estab-lishment un-der glass.	Smallest number in one estab-lishment under glass.	Total square feet of glass in State.	Area of land cultivated (acres).	Value of tools and imple-ments used.	Total value of estab-lishments.
Maine	45		10,000	1,440	211,050	108	\$4,707.00	\$183,618.50
New Hampshire	42	1	12,000	250	182,952	52	7,997.22	162,827.22
Vermont.....	29	2	15,000	800	126,692	77	4,263.00	108,955.12
Massachusetts.....	407	25	40,000	400	2,717,946	467	104,090.25	2,663,587.06
Rhode Island.....	102		26,000	500	549,984	178	14,280.00	526,507.68
Connecticut.....	120	5	100,000	60	1,060,920	255	24,019.20	986,655.60
New York.....	793	50	90,000	200	6,947,298	2,159	\$11,900.34	9,254,873.03
New Jersey.....	866	8	90,000	700	3,703,554	741	155,107.14	3,666,518.46
Pennsylvania.....	544	19	100,000	300	6,066,144	1,448	255,282.88	5,641,513.93
Maryland.....	102	7	60,000	400	872,304	359	22,285.98	758,904.48
Delaware.....	19		12,000	860	120,243	76	16,625.00	99,750.00
District of Columbia.....	35	3	150,000	1,440	649,310	61	20,295.00	571,392.80
Virginia.....	48	7	28,000	150	281,904	86	10,049.83	236,707.84
West Virginia.....	19	1	8,800	350	88,255	31	1,045.00	72,369.10
North Carolina.....	16	6	5,000	150	28,000	112	697.50	22,123.00
South Carolina.....	20	2	7,000	350	60,000	60	740.00	49,800.00
Georgia.....	26	5	15,000	750	99,918	106	5,720.00	81,932.76
Florida.....	8		10,000	200	19,200	12	1,040.50	14,592.00
Ohio.....	393	21	65,000	60	2,785,192	918	114,251.96	2,590,228.56
Indiana.....	107	13	80,000	500	899,549	535	11,029.56	782,607.63
Illinois.....	330	20	70,000	160	3,236,750	990	220,515.90	2,945,442.50
Michigan.....	167	15	100,000	450	1,293,443	583	50,121.71	1,165,484.65
Wisconsin.....	105	6	23,500	300	464,520	367	46,893.00	450,584.40
Minnesota.....	51	5	92,000	200	408,612	115	28,051.00	388,151.40
Iowa.....	69	9	95,000	100	476,588	207	17,883.86	424,158.87
Missouri.....	141	10	65,000	500	1,240,095	287	23,152.21	1,078,882.65
North Dakota.....	4		2,500	500	7,000	2	175.00	6,440.00
South Dakota.....	3		4,000	300	8,500	3	350.00	7,700.00
Nebraska.....	38	4	20,000	200	401,464	65	7,942.00	349,273.68
Kansas.....	58	12	38,000	185	183,324	87	4,844.00	174,372.36
Kentucky.....	81	6	120,000	830	1,163,241	497	24,457.14	918,960.39
Tennessee.....	32	2	25,000	200	411,340	224	17,920.00	313,198.40
Alabama.....	14	2	18,000	1,000	56,700	28	7,700.00	46,494.00
Mississippi.....	9	3	2,000	150	13,950	61	945.00	7,672.50
Louisiana.....	50	2	50,000	500	742,050	100	5,590.00	549,117.00
Texas.....	16	5	3,500	78	29,232	13	2,000.00	21,339.36
Arkansas.....	10	1	15,000	1,000	47,200	20	2,062.50	30,800.00
Montana.....	6		10,000	200	23,000	12	1,500.00	21,120.00
Wyoming.....	3		6,000	300	7,100	3	750.00	6,319.00
Colorado.....	33	8	45,000	100	345,543	150	5,948.25	321,354.99
N. Mexico and Arizona.....	3		1,000	200	2,200	7	145.00	950.00
Utah.....	7		10,000	600	24,425	7	700.00	13,678.00
Washington.....	14	6	4,500	700	87,350	28	2,450.00	29,606.50
Oregon.....	24	3	15,000	380	119,088	38	4,520.00	102,415.68
California.....	150	18	14,000	150	610,622	423	26,210.00	506,816.26
Total in U. S.....	4,659	312			38,823,247	12,161	\$1,587,693.98	\$38,355,722.43

miles, two-thirds of which are regarded as irclaimable, uninhabitable and almost impenetrable. By an extensive drainage system projected by the Atlantic and Gulf Coast Canal and Okeechobee Land Company, a considerable section bordering the extreme northern Everglades, comprising the Lake Okeechobee region, is becoming subjected to the uses of agriculture. Lake Okeechobee, covering an area of 1,000 square miles, was found to have an elevation of about 20 feet above high tide, and by cutting a canal to connect the lake with the Caloosahatchee River its level has been materially lowered, thus reclaiming hundreds of thousands of acres of choice land.

Cotton, rice and sugar-cane are grown considerably, but the most characteristic industry is the cultivation of oranges, lemons and other tropical fruits. Along the St. John's River and throughout the lake region of Central Florida, orange-groves abound on every hand. The principal manufactures are lumber (pine), ship timber, naval stores, leather (made from alligator skins), salt, cotton-seed oil and cigars. The collection and preparation of sponges, large deposits of which occur in the waters of the coast, also furnish occupation to a considerable portion of the population.

In 1886 Florida adopted a new constitution, which went into effect Jan. 1, 1887. Under it the executive department consists of a governor, attorney-general, comptroller, treasurer, superintendent of public instruction and commissioner of agriculture, each of whose term of office is four years. The governor is ineligible to reelection for the next succeeding term. The governor has the appointment of an adjutant-general, with the rank of major-general, who is chief of the governor's staff. The legislative department consists of a senate and house of representatives, the former having 68, and the latter 32 members. Senators are elected for four years, and representatives for two years. The legislature meets biennially, and each session is limited to 60 days. The judicial department consists of a supreme court, with three supreme judges, each holding office six years, and elected by the people, one every two years; circuit courts, with seven circuit judges, one for each judicial circuit, appointed by the governor and confirmed by the senate, the term of office being six years; county courts, one county judge being elected in each county, and holding office four years; and justices' courts, two or more justices of the peace being elected in each county for a term of four years.

GOVERNORS OF FLORIDA.

Andrew Jackson.....	1821-22	John Milton.....	1861-65
William P. Duval.....	1822-24	William Marvin.....	1865-66
John H. Eaton.....	1834-36	David S. Walker.....	1866-68
Richard K. Call.....	1836-39	Harrison Reed.....	1868-72
Robert R. Reid.....	1839-41	O. B. Hart.....	1872-74
Richard K. Call.....	1841-44	M. L. Stearns.....	1874-77
John Branch.....	1844-45	George F. Drew.....	1877-81
W. D. Moseley.....	1845-49	Wm. D. Bloxham.....	1881-85
Thomas Brown.....	1849-53	E. A. Perry.....	1885-89
James E. Broome.....	1853-57	Francis P. Fleming.....	1889-93
Madison S. Perry.....	1857-61	Henry L. Mitchell.....	1893—

The governor, secretary of State, attorney-general, State treasurer and superintendent of public instruction, comprise the State board of education. The public schools are well sustained, and the cities and larger towns contain numerous excellent graded and high schools. There is a State Agricultural College at Lake City; DeLand College at DeLand; East Florida Seminary at Gainesville; West Florida Seminary at Tallahassee; Rollins College at Winter Park; State Normal College for

whites at DeFuniak Springs; a State Normal College for colored teachers at Tallahassee; State Insane Asylum at Chattahoochee; and a State Academy for the Blind, Deaf and Dumb, at St. Augustine.

The area of the State is 58,680 square miles and the population in 1880, 269,493; in 1890, 391,422. The following table gives the population by counties in 1880 and 1890:

Counties.	1890.	1880.
Alachua.....	22,934	16,462
Baker.....	3,533	2,303
Bradford.....	7,516	6,112
Brevard.....	3,401	1,478
Calhoun.....	1,681	1,580
Citrus.....	2,394	.....
Clay.....	5,154	2,838
Columbia.....	12,577	9,589
Dade.....	861	257
De Soto.....	4,944	.....
Duval.....	26,800	19,431
Escambia.....	20,188	12,156
Franklin.....	3,308	1,791
Gadsden.....	11,894	12,169
Hamilton.....	8,507	6,790
Hernando.....	2,476	4,248
Hillsborough.....	14,941	5,814
Holmes.....	4,336	2,170
Jackson.....	17,544	14,372
Jefferson.....	15,757	16,065
La Fayette.....	8,686	2,441
Lake.....	8,034	.....
Lee.....	1,414	.....
Levy.....	17,752	19,662
Leon.....	6,586	5,767
Liberty.....	1,452	1,362
Madison.....	14,315	14,798
Manatee.....	2,895	3,544
Marion.....	20,796	13,046
Monroe.....	18,786	10,940
Nassau.....	8,294	6,635
Orange.....	12,584	6,618
Osceola.....	3,133	.....
Pasco.....	4,249	.....
Polk.....	7,905	3,181
Putnam.....	11,186	6,261
Saint John.....	8,712	4,535
Santa Rosa.....	7,961	6,645
Sumter.....	5,363	4,686
Suwannee.....	10,524	7,161
Taylor.....	2,123	3,279
Volusia.....	8,467	3,204
Wakulla.....	3,117	2,723
Walton.....	4,816	4,201
Washington.....	6,426	4,089

The principal agricultural crops are Indian corn, oats, potatoes and cotton. In 1888 there were devoted to the cultivation of Indian corn 463,392 acres, producing 4,541,000 bushels, valued at \$2,951,650; oats, 53,021 acres, producing 599,000 bushels, valued at \$365,390; potatoes, 2,306 acres, producing 155,000 bushels, valued at \$142,142; cotton, 259,990 acres, producing 30,158,840 pounds, valued at \$2,533,343.

January 1, 1890, there were in Florida 34,737 horses, 13,000 mules, 54,951 milch cows, 565,201 oxen and other cattle, 110,351 sheep, 358,021 hogs.

FLORIDIA, a town of Sicily, in the province of Noto, 7 miles W. N. W. from Syracuse. It stands in a wide plain, surrounded by vineyards, olive-groves, and corn-fields. Population, 8,492.

FLORIN (It., *florino*), a silver coin so called either in allusion to Florence, where it was first struck, in the 12th century, or because it was stamped with a lily. The florin was issued in gold at Florence in 1252. The name was subsequently given to different coins in different countries. England struck a gold florin in 1343, and the silver coin, worth two shillings, or about 48 cents, current since 1849, bears the official name of florin; the florin of the Netherlands is worth about 40 cents, and that of Austria about 36 cents.

FLORINIANS, a Gnostic sect of the second century, so called from a Roman priest, Florinus, a pupil of Polycarp.

FLOTANT, used in heraldry to express that the object is flying in the air, as a banner-flotant.

FLOTOW, FRIEDRICH VON, BARON, a German composer, born at Teutendorf in Mecklenburg, April 27, 1812, died at Wiesbaden, Jan. 24, 1883. At the age of sixteen he went to Paris and began to study under Reicha. His reputation was made by his earliest operas, *Le Naufrage de la Méduse* (1839); *Stradella* (1844); and *Martha* (1847). In 1856 he was appointed intendant of the theater at Schwerin. In 1863 he resigned this position and returned to Paris. Of Flotow's later operas three attained marked success—*Indra* (1853); *La Veuve Grapin* (1859); and *L'Ombre* (1869).

FLOUR, MANUFACTURE OF. See Britannica, Vol. IX, p. 343-47.

FLOUR, St., a small town of France in the department of Cantal, finely situated on a steep basaltic plateau at an elevation of 3,000 feet, 84 miles northeast of Aurillac. It is entirely built of lava and basalt. It has manufactures of hollow ironware, cloth, and table linen. Population, 6,046.

FLOWER, ROSWELL P., was born in Jefferson county, New York, in 1835. He was left fatherless in early boyhood and at the age of 14 became clerk in a country store. He also worked in a brickyard, but managed to get a high-school education and became a postoffice clerk, and then went into the jewelry business for ten years. He next became a successful New York broker, and in 1882 was elected to Congress, defeating W. W. Astor. In 1889 Mr. Flower was again sent to Congress, and in 1891 was elected governor of his native State.

FLOWER, WILLIAM HENRY, an English zoologist, born at Stratford-on-Avon in 1831, served as assistant surgeon in the Crimea, and afterwards became demonstrator of anatomy at the Middlesex hospital. In 1861 he was appointed conservator of the Hunterian Museum, in 1869 Hunterian professor of comparative anatomy and physiology, and in 1884 director of the natural history department of the British Museum. In 1889 he presided over the meeting of the British Association at Newcastle. He is a fellow of the Royal Society, LL.D. of Edinburgh and Dublin, and has written numerous scientific papers and several volumes, chiefly on mammals.

FLOX ERIS, a term applied to the suboxide or red oxide of copper.

FLOYD, JOHN BUCHANAN (1807-63), an American statesman. He was in the Virginia legislature in 1847-49 and 1853, and was governor in 1850-53. He was Secretary of War from 1857 to 1860. In 1861 he was appointed brigadier-general in the Confederate army.

FLOYD, WILLIAM (1734-1821), a Signer of the Declaration of Independence. In 1774 he was a delegate to the Philadelphia Congress, and in 1775 was chosen a delegate to the first Continental Congress. He was a member of every Continental Congress up to 1782, and at the same time, from 1777 to 1783, was State Senator. He held the same office from 1784 to 1788. In 1792, 1800, and in 1804 he was a Presidential elector, and in 1801 he sat for Suffolk county in the convention of that year.

FLUKE, the pointed triangular termination to each arm of an anchor.

FLUME, THE, a cleft in two walls of rock in the Franconian Mountains of the White Mountain region. A small stream flows through this cleft and falls in a cascade 600 feet. This is one of the finest summer resorts of New Hampshire, and is located in Grafton county.

FLUSH-DECK, Decks of vessels are said to be flush when extending without break on one level from the bow to the stern.

FLUSHING, a city of New York, on the north shore of Long Island (see Britannica, Vol. IX, p. 350). The city is largely populated by New York business men, and has all city improvements, such as good schools, churches, street railways, gas and electric lights, free postal delivery, banks, building and loan associations, excellent water works, police force, fire department, and a handsome public park. Population in 1880, 6,682; in 1890, 19,136.

FLUSTRA, a genus of zoöphytes, of the family *Flustridæ*. The name is derived from the Saxon *flustrian*, to weave, because of the mat-like structure of the polypidoms, which in this genus are extremely plant-like, and are often regarded as belonging to the vegetable and not to the animal kingdom. In some species the polypidom assumes the appearance of a branching frond, with polype cells on either side. The polypes have the power of moving either the whole head at once or the tentacles separately, and show no little activity, so that a living flustra seen through a magnifying glass is a most beautiful and interesting object. A single square inch has been found to contain 1,800 cells.

FLUTE-WORK, a name applied to a particular class of stops in organ building, in contradistinction to *reed-work*. There are also numerous stops in organs specially designated with the names of flutes of different kinds, of eight feet and four feet pitch.

FLY-POWDER, the name applied to any powder used to kill flies. It is generally a compound of metallic arsenic and arsenious acid, obtained by the partial oxidation of the metal on exposure to air.

FLYING DRAGON, or **FLYING LIZARD**, a genus of saurian reptiles, allied to iguanas, but remarkably distinguished from them and from all other reptiles now existing, by lateral membranes which support them in a parachute-like manner in the air, and enable them to pass from tree to tree. These membranes are supported on the first six false ribs, which instead of encircling the abdomen stand out at right angles from the body for this purpose, and when not in use they are folded close to the body. There is an inflatable pouch under the chin, sustained partly by the hyoid bone and partly by two small bones. The tongue is extensible, the scales are small and imbricated, and the tail is very long. All the species are of small size and are native of the East Indies. They live among the branches of trees and feed on insects.

FLYING-PHALANGER. See Britannica, Vol. XVIII, pp. 727-29.

FLYING SQUID, a genus of cephalopodous mollusks allied to the Calamaries, but differing from them in having the eyes exposed and not covered with skin. The tail is large, and the power of locomotion great; they not only pass rapidly through the water, but leap out of it high enough sometimes to fall on decks of ships.

FLYING SQUIRREL, a species of the squirrel family (*Sciuridæ*), which have a fold of skin like a parachute along the sides of the body, by which means they are enabled to take extraordinary leaps, gliding for a great distance through the air. Their habits correspond with those of the real squirrel. The North American species, abundant from the Gulf of Mexico to Canada, is six or seven inches long, without the tail; has large black eyes, extremely soft fur, and is very rapid in motion. They are also found in the North of Europe, Asia, and the Indian Archipelago.

FOCUS: in optics, a point in which several rays meet and are collected after being reflected or refracted, while a *virtual focus* is a point from which rays tend after reflection and refraction. The principal focus is the focus of parallel rays after reflection or refraction.

FO, or Foh, the Chinese name for Buddha, the founder of Buddhism, which was introduced into China about A. D. 67.

FOG, or Mist, the visible watery vapor sometimes hanging near the surface of the earth, and caused, as clouds are, by the precipitation of the moisture of the atmosphere. This takes place when a stratum of atmosphere comes in contact with a colder stratum or with a portion of the earth's surface, as a hill by which it is cooled, so that it can no longer hold in solution as much moisture as before. It takes place also when a cold stratum of atmosphere comes above a moist, warm portion of the earth's surface, the exhalations from which are precipitated and become visible as they ascend into it.

FOLGER, CHARLES JAMES, born in Nantucket, Mass., 1818; died 1884. He was admitted to the bar in 1839, and held various judicial offices in New York State. In 1856 he joined the Republican party, and from 1861 to 1869 sat in the State Senate. In 1869-70 he was assistant treasurer of the United States in New York; in 1871 was elected to the State Court of Appeals, served as chief justice in 1880, and was reelected as associate for a full term the same year. In October, 1881, President Arthur made him secretary of the treasury, which office he held until his death. In September, 1882, he received the Republican nomination for governor of New York, but the "mugwumps" voted with the Democrats, and Grover Cleveland defeated Judge Folger by a majority of more than 190,000.

FOLIA MALABATHRI, the dried leaves of *Cinnamomum nitidum*, and partly of *Cinnamomum Tamala*, species of cinnamon, small Indian trees or shrubs. It was formerly much in repute as a medicine, and used as an aromatic tonic.

FOLIATION, a term applied to the alternating layers or plates of different mineralogical nature, of which gneiss and some other metamorphic schists are composed.

FOLKNOTE, the term applied by the Saxons to district meetings generally, or to the general meeting which was afterwards converted into the Witenagemôte, or meeting of the councilors or representatives of the nation.

FOLLY ISLAND, in Charleston county, S. C., is bounded on the southeast by the Atlantic, and on the landward side by Folly Island River, and extends from Lighthouse Inlet on the northeast to Stono River on the southwest. It is in part heavily timbered.

FOMENTATION, an application of warmth and moisture to a part, by means of cloths wrung out in hot water, sometimes medicated with vegetable infusions of substances calculated to relieve pain or stimulate the surface.

FOMITES (Lat. plu. of *fomes*, "fuel"), a term employed in medicine to denote porous substances, such as bedding, furniture, clothing, etc., capable of retaining infection, and by means of which disease may be propagated.

FONDA, the county-seat of Montgomery county, N. Y., situated on the Mohawk River. Pop., 1,190.

FOND DU LAC, a city of Wisconsin, county-seat of Fond du Lac county (see Britannica, Vol. IX, p. 361). Although the population of the city has decreased somewhat during the last decade, it is an important business center, situated in the midst of a fine farming region. It has good water communications, excellent railroad connections, and large manufactories of lumber, sashes, doors and blinds, and agricultural implements. Its principal public buildings are a court-house, opera-house, and high school. It is noted for the number and excellence of its artesian wells, has extensive water-works, and is lighted by gas and electricity. Population in 1880, 13,094; in 1890, 11,942.

FONSECA, MARSHAL MANUEL DA, Brazilian soldier and statesman, was born about 1834. He was educated in Rio Janeiro, and on graduation entered the army. In the war between Brazil and Paraguay, in 1865, he distinguished himself and rose to the rank of major. At the close of the war he was given a command in the province of Matto-Grasso. Subsequently he was made a general and placed in charge of the cartridge factory and magazine at Rio Janeiro, where he organized a military club, in which he became very popular. The influence he gained here over his brother officers was used by him, it is said, to foment discontent in the army, and for the spread of Republican ideas, with which he had become imbued, and the imperial authorities, therefore, transferred him to Matto-Grasso, of which he subsequently became governor. His removal from the Brazilian capital did not, however, stifle the military discontent, which culminated in November, 1889, in an uprising of the army, the expulsion of Emperor Pedro and family, and the proclamation of a republic, of which General Fonseca was made the first president. He proved to be a self-seeking and oppressive ruler, and was in turn the victim of a revolution, March, 1892, which placed Vice-President Peixotts in the presidential chair. The same year saw Fonseca's death.

FONTANELLE, a post-hamlet of Washington county, Neb., on the Elkhorn River, 10 miles northeast of Fremont. It is the seat of a Congregational college.

FOOD. Food is whatever feeds the body, and hence includes air and water, but as generally understood the term is used as referring to such food as requires digestion in the body. Food ought to embrace all the elements found in the body. These, as given by chemists, number 15. According to Prof. Atwater's table the following are the chemical constituents of the body of a man weighing 148 pounds.

5 GASES.....	Oxygen.....	92.4 pounds.
	Hydrogen.....	14.6 "
	Nitrogen.....	4.6 "
	Chlorine.....	0.12 "
	Fluorine.....	0.02 "

3 METALLOIDS..	Carbon.....	33.30 pounds.
	Phosphorus.....	1.40 "
	Sulphur.....	0.24 "
7 METALS.....	Calcium.....	2.80 "
	Potassium.....	0.34 "
	Sodium.....	0.12 "
	Magnesium.....	0.04 "
	Iron.....	0.02 "
	Manganese.....	Traces.
	Copper.....	Traces.

While the body is composed of the 15 elements named above, and in the proportions there stated, it would be impossible to nourish it with them in their elementary condition.

The amount of food required daily Huxley estimated thus: Lean beef-steak, 5,000 grains; milk, 7,000 grains; bread, 6,000 grains; potatoes, 3,000 grains; butter, 600 grains; water, about 6 pounds—taken as both food and drink, to supply the daily loss to the system. The water required for the system comes largely from the food, as is shown by Prof. Atwater in the following tables:

COMPOSITION OF ANIMAL FOODS.

Flesh, etc., Freed from Bone, Shell, and Other Refuse.

KINDS OF FOOD MATERIALS. (Italics indicate European analysis; the rest are American.)	Nutrients.					
	Water.	Total Nutrients.	Nitrogenous (albuminoids).	Fat.	Carbo-hydrates.	Ash.
<i>Meats (Fresh).</i>	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Beef, side, well fattened.....	54.6	45.4	17.2	27.2	.....	1.0
Beef, lean, nearly free from fat.....	76.0	24.0	21.8	0.9	.....	1.3
Beef, round, rather lean.....	66.7	33.3	23.0	9.0	.....	1.3
Beef, sirloin, rather fat.....	60.0	40.0	20.0	19.0	.....	1.3
Beef, neck, "second cut".....	64.5	35.5	19.9	14.5	.....	1.1
Beef, liver.....	69.5	30.5	20.1	5.4	3.5	1.5
Beef, tongue.....	63.5	36.5	17.4	18.0	.....	1.1
Beef, heart.....	56.5	43.5	16.3	26.2	.....	1.0
Veal, lean.....	78.8	21.2	19.9	0.8	.....	0.5
Veal, rather fat.....	72.3	27.7	18.9	7.5	.....	1.3
Mutton, side, well fattened.....	45.9	54.1	14.7	33.7	.....	0.7
Mutton, leg.....	61.8	38.2	18.3	19.0	.....	0.9
Mutton, shoulder.....	58.6	41.4	18.1	22.4	.....	0.9
Mutton, loin (chop).....	49.3	50.7	15.0	35.0	.....	0.7
<i>Meats (Prepared).</i>						
Dried beef.....	56.6	41.4	30.3	4.4	.....	6.7
Corned beef, rather lean.....	58.1	41.9	13.8	26.6	.....	2.0
Smoked ham.....	41.5	58.5	16.7	39.1	.....	2.7
Pork, bacon, salted.....	10.0	90.0	3.0	80.5	.....	6.5
<i>Fowl.</i>						
Chicken, rather lean.....	73.2	27.8	24.4	2.0	.....	1.4
Turkey, medium fatness.....	66.2	33.8	23.8	8.7	.....	1.3
Goose, fat.....	38.0	62.0	15.9	45.6	.....	0.5
<i>Dairy Products, Eggs, etc.</i>						
Cow's milk.....	87.4	12.6	3.4	3.8	4.8	0.7
Cow's milk, skimmed.....	90.7	9.3	3.1	0.7	4.8	0.7
Cow's milk, buttermilk.....	90.3	9.7	4.1	0.9	4.0	0.7
Cow's milk, whey.....	33.2	66.8	0.9	0.2	5.0	0.7
Cheese, whole milk.....	31.2	68.8	27.1	35.4	2.4	3.9
Cheese, skimmed milk.....	41.3	58.7	38.3	6.8	9.0	4.6
Butter.....	9.0	91.0	1.0	87.5	0.5	2.0
Hen's Eggs.....	73.1	26.9	13.4	11.8	0.7	1.0

KINDS OF FOOD MATERIALS. (Italics indicate European analysis; the rest are American.)	Nutrients.					
	Water.	Total Nutrients.	Nitrogenous (albuminoids).	Fats.	Carbo-hydrates.	Ash.
<i>Fish, etc.</i>	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Flounder, whole.....	84.2	15.8	13.8	0.7	.....	1.3
Haddock, dressed.....	81.4	18.6	17.1	0.3	.....	1.2
Bluefish, dressed.....	78.5	21.5	19.0	1.9	.....	1.3
Cod, dressed.....	82.6	17.4	15.3	0.4	.....	1.2
Whitefish, whole.....	69.8	30.2	22.1	6.5	.....	1.6
Shad, whole.....	70.6	29.4	18.5	9.5	.....	1.4
Mackerel, average, whole.....	71.6	28.4	18.3	8.2	.....	1.4
Salmon, whole.....	63.6	36.4	21.6	13.4	.....	1.4
Salt cod.....	53.8	46.1	21.7	0.3	.....	4.1
Smoked herring.....	34.5	65.5	36.4	15.3	.....	1.6
Salt mackerel.....	42.2	57.8	22.1	22.6	.....	2.5
Oysters.....	87.3	12.8	6.0	1.2	3.6	2.0

VEGETABLE FOODS.

KINDS OF FOODS.	Water.	Nutrients.				
		Nitrogenous (albuminoids).	Fats.	Carbo-hydrates, etc.	Wood fiber.	Mineral Matters.
Foods.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Wheat-flour, average*.....	11.6	11.1	1.1	75.4	0.2	0.6
Wheat-flour, maximum*.....	13.5	13.5	2.0	78.5	1.2	1.5
Wheat-flour, minimum*.....	8.3	8.6	0.6	68.3	0.1	0.3
Graham-flour (wheat).....	13.0	11.7	1.7	69.9	1.9	1.8
Cracked wheat.....	10.4	11.9	1.7			1.4
Rye-flour.....	13.1	6.7	0.8	78.3	0.4	0.7
Pearled barley.....	11.8	8.4	0.7	77.8	0.3	1.0
Buckwheat flour.....	13.5	6.5	1.3	77.3	0.3	1.1
Buckwheat "farina".....	11.2	3.3	0.3	84.7	0.1	0.4
Buckwheat "groats".....	10.6	4.8	0.6	83.1	0.3	0.8
Oatmeal.....	7.7	15.1	7.1	67.2	0.9	2.0
Maize-meal.....	14.5	9.1	3.8	69.3	0.8	1.6
Hominy.....	13.5	8.3	0.4	77.1	1.3	0.4
Rice.....	12.4	7.4	0.4	79.2	0.2	0.4
Beans.....	13.7	13.2	2.1	53.7	3.7	3.6
Peas.....	15.0	22.9	1.6	52.4	5.4	2.5
Potatoes.....	75.5	2.0	0.2	20.7	0.6	1.0
Sweet potatoes.....	75.3	1.5	0.4	20.0	1.1	1.2
Turnips.....	91.2	1.0	0.2	6.0	0.9	0.7
Carrots.....	87.9	1.0	0.2	8.9	1.2	0.8
Cabbage.....	90.0	1.9	0.3	4.9	1.8	1.3
Cauliflower.....	90.4	2.5	0.4	5.0	0.9	0.3
Melons.....	95.2	1.1	0.6	1.4	1.1	0.6
Pumpkins.....	90.0	0.7	0.1	7.3	1.3	0.6
Apples.....	84.8	0.4	0.0	12.8	1.5	0.5
Pears.....	83.0	0.4	0.0	12.0	4.3	0.3
Starch.....	15.1	1.2	0.0	83.3	0.0	0.4
Cane Sugar.....	2.2	0.3	0.0	96.7	0.0	0.8
Wheat-bread†.....	32.7	8.9	1.9	53.5		1.0
Graham-bread.....	34.2	9.5	1.4	53.3		1.6
Rye-bread.....	30.0	8.4	0.5	59.7		1.4
Soda crackers.....	8.0	10.3		70.5		1.8
"Boston" crackers.....	8.3	10.7	9.9	68.7		2.4
"Oyster" crackers.....	3.9	12.3	4.3	76.5		3.5
Oatmeal crackers.....	4.9	10.4	13.7	69.6		1.4
Pilot (bread) crackers.....	7.9	12.4	4.4	74.2		1.1
Macaroni.....	13.1	9.0	0.3	76.8		0.8

*Of analysis of American flours. †From flour of about average composition.

A French statistician asserts that a man living for fifty years eats during that time 79,000 pounds of bread, 16,000 of meat, 4,000 of vegetables, eggs and fish, and requires 7,000,000 gallons of water; for fifty-nine per cent. of the entire body is composed of water, which must, therefore, be introduced into the system in about that proportion in our foods, to keep the organism in proper working order, not only keeping the tissues moist and succulent, but by washing out effete matters as well.

Water, as the most important of the inorganic foods, also deserves our careful attention, not only because it composes the bulk of our bodies, but also because it is the agent by which many of their illa are induced. Long ago the human body was defined as forty-five pounds of solid matter, diffused through five and a half pails of water. This is not absolutely exact, but the annexed table shows that water is found in all of the tissues, though in widely varying proportions:

PARTS IN A THOUSAND OF WATER AND SOLIDS. (BESANEZ.)

Parts.	Water.	Solids.
Enamel of the teeth.....	2	998
Teeth.....	100	900
Bones.....	220	780
Fat.....	299	701
Elastic tissue.....	496	504
Cartilage.....	550	450
Liver.....	693	307
Spinal cord.....	667	333
Skin.....	720	280

PARTS IN A THOUSAND OF WATER AND SOLIDS. (BESANEZ.)

Parts.	Water.	Solids.
Brain.....	750	250
Muscles.....	757	243
Spleen.....	758	242
Nerves.....	780	220
Blood.....	791	209
Connective tissue.....	796	204
Kidneys.....	827	173
Bile.....	864	136
Milk.....	891	109
Chyle.....	928	72
Mucus.....	934	66
Lymph.....	983	17
Spinal fluid.....	988	12
Saliva.....	995	5
Sweat.....	998	2

It is known that a man loses on the average about two quarts of water per day. About a quarter of this amount passes by the lungs, and the remainder by the skin and kidneys.

DIGESTING FOOD.—The first stage in the process of digestion is that of mastication, in which solid foods are ground fine and mixed thoroughly with the fluids of the mouth. These fluids are supplied by the mucous and salivary glands. Together

they secrete about a quart of liquid, which is continually being poured through the ducts leading from these glands. The ducts of the sublingual and submaxillary glands, near together, open into the mouth just beneath the tongue, while the ducts of the parotids pour their saliva into the mouth through openings nearly opposite the second of the molars of the upper jaw. With the tip of the tongue the saliva can be continually felt trickling out of these apertures, and greatly increased in quantity while dining, or when the mouth "waters" for something good to eat.

The purpose of the saliva is two-fold: first, to lubricate the food so thoroughly that swallowing may be easy; and, second, to effect in the starch of the food a chemical change which transforms it into a variety of sugar (glucose) that can be utilized in the body. If for any reason this is not accomplished, either because the food is not finely enough ground by the teeth or because the saliva is deficient in quantity or quality, starchy indigestion results, and hence for many dyspeptics bread is the most difficult thing to digest. Young infants have little or no saliva, and hence are unable properly to digest starchy food. Although small quantities may be disposed of lower down in the alimentary canal, the bulk of these starchy foods remains undigested, and causes innumerable infantile colics and not a few deaths. The majority of patent infant foods are starchy in their nature, and hence evil in their effects. Milk, properly prepared, is the best food for babies for the reason that it contains all the necessary elements of food, namely: inorganic salts, albuminoids (casein or curd), and hydrocarbons in the cream and sugar of the milk.

Let us, then, briefly consider in detail the digestion of a mouthful of milk, since it contains all the ingredients necessary for the nourishment of the body, and all the essential varieties of food that can be found on any table. Undigested milk is poison, but properly digested it forms bone, muscle, sinew, by the aid of germinal matter. Each kind of germinal matter needs its appropriate nourishment, all of which can be gathered from the curd, cream, and salts of milk.

First, as to the curd, which corresponds to the nitrogenous foods of the adult. With the latter the nitrogenous food requires to be reduced to small fragments by the teeth before it descends the esophagus. Liquids escape this process, and immediately find their way down into the stomach, whose acid juices immediately clot it. If these clots are too large, or firm, they cause distress; but if the milk is properly acted on it forms soft, fine curds, which are more digestible than the original milk, for they contain their nitrogenous matter in a form readily to be acted upon by the gastric juice, which is an acid fluid constantly secreted by glands located in the membrane lining the inside of the stomach. The duty of these glands, known as the "peptic glands," is to prepare the gastric juice, or fluid, which is a colorless, watery, acid liquid containing from three to four parts in a thousand of pepsin, an animal ferment, which has the remarkable property of transforming albuminoids into peptones. A solution of peptone looks very like a solution of albumen, from which it differs mainly in the fact that albumen is unable to pass through the animal membranes, while peptone readily does so. The peptonized albuminoids pass directly through the coats of the stomach into the lacteals there located.

But all our food is not albuminoid, and hence is not digested in the stomach. Portions which are not peptonized, and which, therefore, cannot enter into the lacteals, pass in the circulation as chyme

through the pylorus into the smaller intestines, where the digestion is completed. In the intestines the chyme is mixed with bile and other ferments. The following table, showing not only their names, but their uses, is taken from Roberts:

NAME.	FUNCTION.
1. <i>Phyalin</i> , or salivary diastase, contained in the saliva.	1. Changes starch into dextrine and glucose.
2. <i>Pepsin</i> , contained in gastric juice.	2. In acid fluids changes albuminoids into peptones.
3. <i>Curdling ferment</i> , contained in gastric juice.	3. Coagulates casein.
4. <i>Trypsin</i> , contained in pancreatic juice.	4. In alkaline solutions transforms proteids into peptones.
5. <i>Curdling ferment</i> , found in pancreatic juice.	5. Coagulates milk casein.
6. <i>Pancreatic diastase</i> , found in pancreatic juice.	6. Changes starch into dextrine and glucose.
7. <i>Emulsive ferment</i> , found in pancreatic juice.	7. Emulsifies fats.
8. <i>Bile</i> , poured into duodenum.	8. Assists in emulsifying fats.
9. <i>Invertin</i> , found in intestinal juice.	9. Converts cane sugar into inverted sugar.
10. <i>Curdling ferment</i> , found in intestinal juice.	10. Coagulates casein.

TIME REQUIRED FOR DIGESTING FOOD.—The following figures have been tabulated as the result of repeated and careful experiments:

Food.	How Cooked.	H. M.
Apples, sour, mellow.....	Raw.....	2.00
Apples, sour, hard.....	Raw.....	2.50
Apples, sweet, mellow.....	Raw.....	1.50
Bass, striped.....	Boiled.....	3.00
Beans, pod.....	Boiled.....	3.50
Beans and green corn.....	Boiled.....	3.45
Beef.....	Fried.....	4.00
Beefsteak.....	Broiled.....	3.00
Beef, fresh, lean, dry.....	Roasted.....	3.30
Beef, fresh, lean, rare.....	Roasted.....	3.00
Beets.....	Boiled.....	3.45
Brains, animal.....	Boiled.....	3.45
Bread, corn.....	Baked.....	3.15
Bread, wheat, fresh.....	Baked.....	1.30
Cabbage.....	Raw.....	2.30
Cabbage, with vinegar.....	Raw.....	2.00
Cabbage.....	Boiled.....	1.50
Carrot, orange.....	Boiled.....	3.15
Catfish.....	Fried.....	3.30
Cheese, old, strong.....	Raw.....	3.30
Chicken, full grown.....	Fricassee.....	2.45
Codfish, cured dry.....	Boiled.....	2.00
Custard.....	Baked.....	2.45
Duck, tame.....	Roasted.....	4.00
Duck, wild.....	Roasted.....	4.30
Eggs, fresh.....	Raw.....	2.00
Eggs, fresh.....	Whipped.....	1.30
Eggs, fresh.....	Roasted.....	2.15
Eggs, fresh.....	Soft boiled.....	3.00
Eggs, fresh.....	Hard boiled.....	3.30
Eggs, fresh.....	Fried.....	3.30
Fowls, domestic.....	Roasted.....	4.00
Fowls, domestic.....	Boiled.....	4.00
Gelatine.....	Boiled.....	2.20
Goose, wild.....	Roasted.....	2.30
Hashed meat and vegetables.....	Warmed.....	2.30
Heart, animal.....	Fried.....	4.00
Lamb, fresh.....	Broiled.....	2.50
Liver, beeve's, fresh.....	Broiled.....	2.00
Milk.....	Boiled.....	2.00
Milk.....	Raw.....	2.15
Mutton, fresh.....	Broiled.....	3.00
Mutton, fresh.....	Boiled.....	3.00
Mutton, fresh.....	Roasted.....	3.15
Oysters, fresh.....	Raw.....	2.55
Oysters, fresh.....	Roasted.....	3.15
Oysters, fresh.....	Stewed.....	3.30
Parsnips.....	Boiled.....	2.30
Pig, sucking.....	Roasted.....	2.30
Pigs' feet, soured.....	Boiled.....	3.00
Pork, fat and lean.....	Broiled.....	3.15
Pork, recently salted.....	Stewed.....	3.00
Pork, recently salted.....	Broiled.....	3.15
Pork, recently salted.....	Fried.....	4.15
Pork, recently salted.....	Boiled.....	4.20

TIME REQUIRED FOR DIGESTING FOOD.—Continued.

Food.	How Cooked.	H. M.
Potatoes, Irish.....	Roasted.....	2.30
Potatoes, Irish.....	Baked.....	2.30
Potatoes, Irish.....	Boiled.....	3.30
Salmon, salted.....	Boiled.....	4.00
Sausages, fresh.....	Broiled.....	3.30
Soup, barley.....	Boiled.....	3.30
Soup, bean.....	Boiled.....	3.00
Soup, chicken.....	Boiled.....	3.00
Soup, mutton.....	Boiled.....	3.30
Soup, oyster.....	Boiled.....	3.00
Soup, beef, vegetables.....	Boiled.....	4.00
Soup, marrow bones.....	Boiled.....	4.15
Tripe, soured.....	Boiled.....	1.00
Trout, salmon, fresh.....	Boiled.....	1.30
Trout, salmon, fresh.....	Fried.....	1.30
Turkey, wild.....	Roasted.....	2.18
Turkey, domesticated.....	Roasted.....	2.30
Turkey, domesticated.....	Boiled.....	2.25
Turnips.....	Boiled.....	3.30
Veal, fresh.....	Boiled.....	4.00
Veal, fresh.....	Fried.....	4.30
Venison steak.....	Broiled.....	1.35

COOKING MEATS.—For all ordinary food, all the nutritious constituents should be retained either in the meat itself or in its liquid surrounding. The albumen, gelatine, and fibrine of the meat must be retained in a state of semi-solidity. To do this both cold and boiling water should be avoided. Cold water takes out the albumen. This will be shown by immersing minced meat (the mincing increasing the amount of surface to the water) in cold water for a few hours; on removing and straining such minced meat it will be found to have lost its color, and if it be now cooked it is insipid, and even nauseous if eaten in any quantity; if given to dogs, cats, and pigs, they will soon turn from it, and if limited to this juiceless food, will speedily languish and die. "Although the meats from which the juices have been extracted are nearly worthless *alone*, and those from which the juices are nearly extracted are nearly worthless *alone*, either of them becomes valuable when eaten with the juices."*

Boiling water hardens the albumen of meat to a leathery appearance. This may be shown experimentally by subjecting an ordinary beefsteak to the action of boiling water for about half an hour. It will come out in what Williams calls "the abominable condition too often obtained by English cooks." The water, instead of boiling (212°) should beat the temperature at which albumen just begins to coagulate; that is, about 134°, or between that and 160° as the extreme. This is not the condition of "simmering," for that is about the same as boiling; namely, 212°. It is said that the French cook escapes the "simmering delusion" by her use of the *bain marie*, or "water bath," as the chemist calls it in the laboratory. It is simply a vessel immersed in an outer vessel of water; the water in the outer vessel may "simmer" or boil, while that in the inner vessel cannot because of the less heat. Some persons use a "milk-scald" for the purpose.

One of the incidental advantages of the *bain marie* is that the stewing may be performed in earthenware or even glass vessels, seeing that they are not directly exposed to the fire. Other forms of such double vessels are obtainable at the best house-furnishing stores. A very neat apparatus of this kind is "Dolby's Extractor," which consists of an earth-

enware vessel that rests on a ledge, and thus hangs in an outer tin-plate vessel; but, instead of water, there is an air-space surrounding the earthenware pot. A top screws over this, and the whole stands in an ordinary saucepan of water. The heat is thus very slowly and steadily communicated through an air-bath, and it makes excellent beef-tea; but, being closed, the evaporation does not keep down the temperature sufficiently to fulfill the above-named conditions for perfect stewing. At temperatures *below the boiling-point* evaporation proceeds superficially, and the rate of evaporation at a given temperature is proportionate to the surface exposed, irrespective of the total quantity of water; therefore, the shallower the inner vessel of the *bain marie*, and the greater its upper outspread, the lower will be the temperature of its liquid contents when its sides and bottom are heated by boiling water. The water in a basin-shaped inner vessel will have a lower temperature than that in a vessel of similar depth, with upright sides, and exposing an equal water surface. A good water-bath for stewing may be extemporized by using a common pudding-basin (one with projecting rim, as used for tying down the pudding-cloth), and selecting a saucepan just big enough for this to drop into, and rest upon its rim. Put the meat, etc., to be stewed into the basin, pour hot water over them, and hot water into the saucepan, so that the basin shall be in a water-bath; then let this outer water simmer very gently, so as not to jump the basin with its steam. Stew thus for about double the time usually prescribed in cookery-books, and compare the result with similar materials stewed in boiling or "simmering" water.

We quote again from Williams: "I may, however, mention an experiment that I have made lately. I killed a superannuated hen—more than six years old, but otherwise in very good condition. Cooked in the ordinary way she would have been uneatably tough. I cannot guarantee the maintenance of the theoretical temperature, having suspicion of some simmering. After this she was left in the water until it cooled, and on the following day was roasted in the usual manner; that is, in a roasting oven. The result was excellent; as tender as a full-grown chicken roasted in the ordinary way, and of quite equal flavor, in spite of the very good broth obtained by the preliminary stewing. This surprised me. I anticipated the softening of the tendons and ligaments, but supposed that the extraction of the juices would have spoiled the flavor. It must have diluted it, and that so much remained was probably due to the fact that an old fowl is more fully flavored than a young chicken. The usual farm-house method of cooking old hens is to stew them simply; the rule in the midlands being one hour in the pot for every year of age. The feature of the above experiment was the supplementary roasting. As the laying season comes to an end, old hens will be a drug in the market, and those among my readers who have not a hen roost of their own will oblige their poultryers by ordering a hen that is warranted to be four years old or upward. If he deals fairly he will supply a specimen upon which they may repeat my experiment very cheaply. It offers the double economy of utilizing a nearly waste product and obtaining chicken-broth and roast fowl simultaneously."

"One of the great advantages of stewing is that it affords a means of obtaining a savory and very wholesome dish at a minimum of cost. A small piece of meat may be stewed with a large quantity of vegetables, the juice of the meat savoring the whole. Besides this it costs far less fuel than roasting."

*W. Mattien Williams, a well-known chemical authority. In the preparation of this article the editor has drawn freely from the facts presented by Prof. Williams in an admirable series of articles furnished for "Knowledge," England, and subsequently reproduced in America.

"The wife of the French or Swiss landed proprietor, that is, the peasant, cooks the family dinner with less than a tenth of the expenditure of fuel used in England for the preparation of an inferior meal. A little charcoal under her *bain marie* does it all. The economy of time corresponds to the economy of fuel; for, the mixture of viands required for the stew once put into the pot, it is left to itself until dinner-time, or at most an occasional stirring of fresh charcoal into the embers is all that is demanded."

RELATIVE VALUE OF VEGETABLE AND ANIMAL FOOD.—Williams, in his article in "Knowledge," well says: "At the outset it is necessary to brush aside certain false issues that are commonly raised in discussing this subject. The question is not whether we are herbivorous or carnivorous animals. It is perfectly certain that we are neither. The carnivora feed on flesh alone, and eat that flesh raw. Nobody proposes that we should do this. The herbivora eat raw grass. Nobody suggests that we should follow their example. It is perfectly clear that man cannot be classed either with the carnivorous animals or the herbivorous animals, nor with the graminivorous animals. His teeth are not constructed for munching and grinding raw grain, nor his digestive organs for assimilating such grain in this condition. He is not even to be classed with the omnivorous animals. He stands apart from all as "The Cooking Animal." All human beings became cooks as soon as they learned how to make a fire, and have continued to be cooks ever since.

The composition of the mother's milk throws much light upon this "vegetable-animal" controversy. The milk prepared for the young of different food-supplying and non-food supplying animals in the laboratory or kitchen of Nature must be regarded as directly adapted to their structure as regards natural food requirements. We find, ready to hand, in Dr. Miller's Chemistry, Vol. III, a comparative statement of the mean of several analyses of the milk of woman, cow, goat, and sheep, from which we quote the following:

Composition.	Woman.	Cow.	Goat.	Sheep.	Dog.
Water.....	88.6	87.4	83.0	85.6	66.3
Fat.....	3.6	4.0	4.5	4.5	14.8
Sugar and soluble salts.....	4.9	5.0	4.5	4.2	2.9
Nitrogenous compounds and insoluble salts.....	3.9	3.6	9.0	5.7	16.0

It is quite evident from the above table that Nature regards our food requirements as approaching much nearer to the herbivora than to the carnivora, and has provided for us accordingly. The food which Nature provides for the human infant differs from that provided for the carnivorous animal in the same way that cooked vegetables and fruit within easy reach of man differ from flesh food.

In practice there are distinctive flesh-eaters among us—none who avail themselves of the higher proportion of albuminoids and fat. All practically admit in eating their ordinary dinner that an excess of nitrogenous matter and fat is bad. They do so by mixing the meat with potatoes, the latter containing an excess of starch (carbo-hydrate) and a small amount of albuminoids and fat. The slice of meat mixed with the lump of potato brings the whole down to the average composition of a fairly arranged vegetarian meal. By a vegetarian repast is not meant mere cabbage and potatoes, but properly selected, well-cooked, nutritious vegeta-

ble food. As an example, take equal weights of beef and potatoes composing the meal, without bread, and we have the following analysis according to the table given by Pavy:

Mixed dinner.	Water.	Albumen.	Starch.	Sugr.	Fat.	Salts.
Lean beef.....	72.00	19.30	.....	.....	3.60	5.10
Potatoes.....	75.00	2.10	18.80	3.20	0.20	0.70
	147.00	21.40	18.80	3.20	3.80	5.80
Mean composition.	73.50	10.70	9.40	1.60	1.90	2.90

Compare with the above the meal furnished to the poor in Munich by Count Rumford's soup (without bread—afterward added), No. 1 composed of equal measures and weights of peas and pearl-barley, or barley meal. Their percentage of composition was as follows:

Rumford's soup.	Water.	Albumen.	Starch.	Sugr.	Fat.	Salts
Peas.....	15.00	23.00	55.40	2.00	2.10	2.50
Barley-meal.....	15.00	6.30	69.40	4.90	2.40	2.00
	30.00	29.30	124.80	6.90	4.50	4.50
Mean composition of mixture.....	15.00	14.65	62.40	3.45	2.25	2.25

Here, then, in one hundred parts of the material of Rumford's half-penny dinner, as compared with the "mixed diet," we have forty per cent. more of nitrogenous food, more than six and a half times as much carbo-hydrate in the form of starch, more than double the quantity of sugar, about seventeen per cent. more of fat, and only a little less of salts (supplied by the salt which Rumford added).

The great German scientific philanthropist states that he found that less than five ounces of solids was sufficient for each man's dinner. He was supplying far more nutritious material than beef and potatoes, and therefore his five ounces were more satisfactory than a pound of beef and potatoes, three-fourths of which is water, for which water the buyer pays a good round price per pound when he buys his prime steak. Count Rumford added the water at pump cost, and, by long boiling claimed to have caused some of it to unite with the solid materials (by the hydration), and then served the combination in the form of porridge, raising each portion to 19¾ ounces. Williams adds one more example for comparison, namely, the Highlander's porridge. The following is the composition of oat meal taken also from Pavy's table:

Water.....	15.00
Albumen.....	12.60
Starch.....	58.40
Sugar.....	5.40
Fat.....	5.60
Salts.....	3.00

If this be compared with the beef and potatoes above, it will be seen that it is superior in every item except the water; this deficiency being readily supplied at the pump. These figures solve a problem that may have suggested itself to some; namely, the smallness of the quantity of dry oat meal that is used in making a large porridge. If we could in like manner see our portion of beef or mutton and potatoes reduced to dryness, the smallness of the quantity of actually solid food required for a meal would be similarly manifest. Williams

continues: "My own experiments on myself, and the multitude of other experiments that I am daily witnessing among men of all occupations, who have cast aside flesh-food after many years of mixed diet, prove incontestably that flesh-food is really unnecessary. On economical grounds, however, the difference is enormous. * * * If all were vegetarians in any country the land would be one of gardens and orchards instead of largely being a grazing ground as at present. Every acre of land would require three or four times as much labor, and feed five or six times as many people.

Dr. B. W. Richardson, F. R. S., a leading and accredited authority on the subject of hygiene, says in his book on *Food Thrift*:

"We have also to learn, as a first truth, that the oftener we go to the vegetable world for our food the oftener we also go to the first, and, therefore, to the cheapest source of supply. The commonly accepted notion that when we eat animal flesh we are eating food at its prime source cannot be too speedily dissipated or too speedily replaced by the knowledge that there is no primitive form of food—albuminous, starchy, osseous—in the animal world itself, and that all the processes of catching an inferior animal, of breeding it, rearing it, keeping it, killing it, dressing it, and selling it, means no more nor less than entirely additional expenditure, throughout, for bringing into what we have been taught to consider an acceptable form of food the veritable food which the animal itself found, without any such preparation, in the vegetable world. With the light of these natural facts filling the national mind, the tendencies of all advanced scholars in thrift should unquestionably be to find out plans for feeding all the community, as far as is possible, direct from the lap of earth; to endeavor to discover how the fruits of the earth may be immediately utilized as food; and to impress science into our service, so that she, in her laboratories, may prepare the choicest viands, minus the necessity of making a lower animal the living laboratory for the sake of what is just a little higher than cannibal propensities."

CHEAP DINNERS FOR SCHOOL CHILDREN.—During the last few years, experiments have been made on an extensive scale in different countries in Europe, in order to test the cost, healthfulness, and popular approval of a system of cheap dinners for the benefit of the national and board schools. The editor of these supplementary volumes is indebted to Mr. George Herbert Sargent, of Birmingham, England, one of the founders and chief promoters of the system, for numerous documents setting forth the results of such experiments in various parts of Great Britain and on the Continent. The limits prescribed for this article permit the insertion of only a few of the many tables reported. In the Kendal District cheap dinners were started for the supply of two country schools about one mile apart. The managers provided the following plant: 100 soup plates; 100 small spoons; one eight-gallon iron pan; one five-gallon can; 20 basins; one pair of scales; two ladies and one bucket. The dinners were served in a vacant cottage, free of rent in each case, near the school, by a woman who was paid 25 cents per day. Fuel cost 35 cents per week. The menu was the following:

On Mondays, Tuesdays, and Thursdays, soup and hash—

Soup.	Hash.
5 lbs. peas,	5 stone potatoes,
3 lbs. barley,	1½ lbs. onions,
2 lbs. bones,	8 oz. salt,
¾ lb. beef dripping,	¾ oz. pepper,
¾ lb. onions,	3 lbs. meat,
6 oz. salt,	
½ oz. pepper.	

On Wednesdays and Fridays, hash and pudding—

Hash.	Pudding.
3½ stone potatoes,	1½ stone flour,
1½ lbs. meat,	1 lb. lard,
1 lb. onions,	2 baking powders,
6 oz. salt,	4 lbs. treacle or preserve,
½ oz. pepper.	Salt.

The quantities given were sufficient for 80 children; the average number present, 72. The pupils

who were able to pay were charged one English penny for a single dinner, or fourpence per week, the dinner being served on the five school days. In case of deficiency caused by free dinners, the lack was supplied from private sources.

Mr. A. F. Hills, of the Thames Ironworks, Blackwall, describes in the "Times" the success of some penny dinners established in that neighborhood upon vegetarian principles. From November to March the experiment was first tried, and, in spite of the difficulties inherent in the organization of a new scheme, proved so popular that the small deficit of some \$15 for the first season, upon 6,500 dinners, was no deterrent to starting them again in the October of the next year. Twelve per cent. of the dinners were gratuitous. The children have varied from seven to boys of 14, and the average attendance has been about 100 per diem. This has been so regular as to prove, not only that the children find the food palatable, but that the parents are quite satisfied with the nutritive and healthful properties of the new diet. The nutritive value of the cereals and pulses (wheat, barley, oats, beans, peas, and lentils) is as three to one when compared with meat; its economy as 18 to one.

In a subsequent letter to the London "Times," Mr. Hills gives, as a result of thorough experiment, the following recipe for the penny meal:

"To make one gallon, take ¼ lb. whole wheat meal and 1 lb. of lentils and boil for two hours, then add 1 lb. of potatoes (mashed) and 1 lb. of mixed vegetables (turnips, carrots, parsnips, etc.). Both potatoes and vegetables should be chopped or grated as fine as possible, and, to make the best soup, should be boiled separately from the grains. Add the vegetables to the grains, and boil for another hour and stir well. Flavor to taste with butter, sweet herbs, and spices. The soup can be varied from day to day by the introduction of other grains—*i. e.*, oats, barley, rice, peas, beans, and maize; and where economy is the first consideration the butter can be substituted by the best refined seed oil, or be omitted altogether. When properly made this soup cannot be distinguished from ordinary stock soup, and contains a far higher value of nutritious food."

Mr. G. H. Sargent had reported from the city of Birmingham in a period of five months a total of about 300,000 school dinners, of which the following were from the kitchen under his own charge:

	Costing.
9,833½ at a halfpenny (paid for), costing about.....	\$102
4,709½ at a halfpenny (free).....	93
30,381 at a farthing (paid for).....	155
104,087 at a farthing (free).....	540
17,210 at 30 for 1s. (free).....	120
166,231	966

His experience is thus summarized:

"In making out a recipe I have much more regard to the solids as a medium for presenting hot water in a wholesome and palatable form than I have to the hot water as a medium for rendering the solids digestible. It is no new theory that the value of a food-stuff should be measured by the quantity of water it will solidify or jellyify. This property is possessed in a singular degree by legumes, and by the other ingredients which I chiefly use, *viz.*, ground Scotch barley and Indian meal; to oatmeal, unfortunately, there is an almost unconquerable aversion amongst the English poor. The water absorbed by the farinaceous foods is presented to the digestive organs in a manner differing totally from that of water taken as a liquid, and it cannot be too constantly borne in mind that the nutritive value of a food depends far more on the suitability of its form for digestion and assimilation than on its chemical composition. Of the results obtained by the practical working out of the theory sketched above the value has been proved by careful observation. It has been found that two or three of our dinners a week given throughout the winter to half-starved children, in addition to what they could get before, change them from a pinched to a fairly well-fed condition, fill them with life and spirits instead of dullness and misery. The popularity of the soups is tested in the simplest way: no compulsion whatever is laid on the children to finish what is given them. They are not pressed or even encouraged—to eat more than they feel an inclination for; yet we rarely find, as we often did when the dinners were far more costly, that any is left. The very cheapest

dinners are by far the most popular. Peas and lentils meet another distinct want. It has been noticed that the children prefer something moderately solid. This legumes just supply; they retain enough hardness when cooked to want biting, but not enough to make them indigestible. They have further these enormous advantages: when one has once learned where to buy and how to cook them, they are very cheap and give very little trouble."

COMPARATIVE VALUE OF CHEESE.—Casein, the substantial basis of cheese, is the consolidated curd of milk, and is one of the most important constituents of animal food, although it is not contained in beef, mutton, poultry, fish or game. It exists in the soluble form in milk, and the insoluble in cheese. It contains more nutritious material than any other food that is ordinarily obtainable, and all that is needed to render it invaluable is the right way of cooking it.

When compared with animal food (excluding bone) the following figures are given, the best parts of the meat being taken in each case: Beef contains, on an average, 72½ per cent. of water; mutton, 73½; veal, 74½; pork, 69½; fowl, 73¼; while Cheshire cheese contains only 30½, and other cheeses about the same. Thus, at starting, we have in every pound of cheese rather more than twice as much solid food as in a pound of the best meat; or, comparing with the average of the whole carcass, including bone, tendons, etc., the cheese has an advantage of three to one.

The following results of Mulder's analysis of casein, when compared with those (by the same chemist) of albumen, gelatine, and fibrin, show that there is but little difference in the ultimate chemical composition of these, so far as the constituents there named are concerned:

Carbon.....	53.83	} Casein.
Nitrogen.....	7.15	
Oxygen.....	15.65	
Sulphur.....	23.37	

Constituents.	Albumen.	Gelatine.	Fibrin.
Carbon.....	53.5	53.40	52.7
Hydrogen.....	7.0	6.94	6.9
Nitrogen.....	15.5	18.34	15.4
Oxygen.....	22.0	24.62	23.5
Sulphur.....	1.6	24.62	1.2
Phosphorus.....	0.4	24.62	0.3

We may therefore conclude that, regarding these from the point of view of nitrogenous or flesh-forming and carbonaceous or heat-giving constituents, these chief materials of flesh and of cheese are about equal.

The same is the case as regards the fat. The quantity in the carcass of oxen, calves, sheep, lambs, and pigs varies, according to Dr. Edward Smith, from 16 per cent. to 31.3 per cent. in moderately fattened animals, while in whole-milk cheeses it varies from 21.68 per cent. to 32.31 per cent., coming down in skim-milk cheeses as low as 6.3. Dr. Smith includes Neufchâtel cheese, containing 18.74 per cent. among the whole-milk cheeses. He does not seem to be aware that the cheese sold under that name is *ricotta*, or crude curd of skim-milk cheese. Its just value is about six cents per pound. In Italy, where it forms the basis of some delicious dishes (such as *budino di ricotta*), it is sold for about twopence per pound or less.

In comparing the nutritive value of cheese with that of flesh, the retention of phosphate of lime nearly corresponds with the retention of the juices of the meat, among which are the phosphates of the flesh. These phosphates of lime are the bone-

making material of food, and have something to do in building up the brain and nervous matter, though not to the extent that is supposed by those who imagine that there is a special connection between phosphorus and the brain, or phosphorescence and spirituality. Bone contains about 11 per cent. of phosphorus, brain less than 1 per cent.

The value of food in reference to its phosphate of lime is not merely a matter of percentage, as this salt may exist in a state of solution, as in milk, or as a solid very difficult of assimilation, as in bones. That retained in cheese is probably in an intermediate condition—not actually in solution, but so finely divided as to be readily dissolved by the acid of the gastric juice. It may be mentioned, in reference to this, that, when a child or other young animal takes its natural food in the form of milk, the milk is converted into unpressed cheese, or curd, prior to its digestion.

Supposing that, on an average, cheese contains only one-half of the six per cent. of phosphate of lime found in the casein, and taking into consideration the water contained in flesh, the bone, etc., we may conclude, generally, that one pound of average cheese contains as much nutriment as three pounds of the average material of the carcass of an ox or sheep as prepared for sale by the butcher; or, otherwise stated, a cheese of twenty pounds weight contains as much food as a sheep weighing sixty pounds as it hangs in the butcher's shop.

Now comes the practical question: Can we assimilate or convert into our own substance the cheese-food as easily as we may the flesh-food? To this question Mr. Williams answers:

"I reply that we certainly cannot if the cheese is eaten raw; but have no doubt that we may if it be suitably cooked. Hence the paramount importance of this part of my subject. A Swiss or Scandinavian mountainer can and does digest and assimilate raw cheese as a staple article of food, and proves its nutritive value by the result; but feeble bipeds of the plains and towns cannot do the like.

"In the fatherland of my grandfather, Louis Gabriel Mattien, one of the commonest dishes of the peasant who tills his own freehold and grows his own food is a 'fondevin.' This is a mixture of cheese and eggs, the cheese grated and beaten into the egg as in making omelets, with a small addition of new milk or butter. It is placed in a little pan like a flower-pot saucer, cooked gently, served as it comes off the fire, and eaten from the vessel in which it is cooked. I have made many a hearty dinner on one of these, *plus* a lump of black bread and a small bottle of genuine but thin wine; the cost of the whole banquet at a little *auberge* being usually less than sixpence. The cheese is in a pasty condition, and partly dissolved in the milk or butter. I have tested the sustaining power of such a meal by doing some very stiff mountain-climbing and long-fasting after it. It is rather too good—over-nutritious—for a man only doing sedentary work.

"A diluted and delicate modification of this may be made by taking slices of bread, or bread and butter, soaking them in a batter made of eggs or milk—without flour—then placing the slices of soaked bread in a pie-dish, covering each with a thick coating of grated cheese, and thus building up a stratified deposit to fill the dish. The surplus batter may be poured over the top; or, if time is allowed for saturation, the trouble of preliminary soaking may be saved by simply pouring all the batter thus. This, when gently baked, supplies a delicious and highly nutritious dish. We call it cheese-pudding at home, but my own experience convinces me that we make a mistake in using it to supplement the joint. It is far too nutritious for this; its savory character tempts one to eat it so freely that it would be far wiser to use it as the Swiss peasant uses his *fondevin*—that is, as the one and only dish of a good, wholesome dinner.

"I have tested its digestibility by eating it heartily for supper. No nightmare has followed. If I sup on a corresponding quantity of raw cheese, my sleep is miserably eventful."

USE OF SALT IN FOOD.—The value of salt in connection with our food is much greater than is generally understood among the common people. Common salt is the most widely distributed substance in the body; it exists in every fluid and in every solid; and not only is it everywhere present, but in almost every part it constitutes the largest

portion of the ash when any tissue is burned. In particular, it is a constant constituent of the blood, and it maintains in it a proportion that is almost wholly independent of the quantity that is consumed with the food. The blood will take up so much and no more, however much we may take with our food; and, on the other hand, if none be given, the blood parts with its natural quantity slowly and unwillingly. Under ordinary circumstances, a healthy man loses daily about 12 grains by one channel or the other, and, if he is to maintain his health, that quantity must be introduced.

Common salt is of immense importance in the processes ministering to the nutrition of the body, for not only is it the chief salt in the gastric juice, and essential for the formation of bile, and may hence be reasonably regarded as of high value in digestion, but it is an important agent in promoting the processes of diffusion, and therefore of absorption. Says the London "Lancet":

"Direct experiment has shown that salt promotes the decomposition of albumen in the body, acting, probably, by increasing the activity of the transmission of fluids from cell to cell. Nothing can demonstrate its value better than the fact that, if albumen without salt is introduced into the intestine of an animal no portion of it is absorbed, while it all quickly disappears if salt be added. If any further evidence were required, it would be found in the powerful instinct which impels animals to obtain salt. Buffaloes will travel for miles to reach a "salt-lick"; and the value of salt in improving the nutrition and the aspect of horses and cattle is well known to every farmer. The popular notion that the use of salt prevents the development of worms in the intestine has a foundation in fact, for salt is fatal to the small thread worms, and prevents their reproduction by improving the general tone and the character of the secretions of the alimentary canal. The conclusion, therefore, is obvious that salt, being wholesome, and indeed necessary, should be taken in moderate quantities, and that abstinence from it is likely to be injurious."

DIET FOR THE GOUTY.—Extended and carefully noted experience seems to show that persons troubled with what is called *lithic acid diathesis* may receive invaluable benefit by the use (under the direction of competent and conscientious physicians) of pot-ash salts. Lithic acid (stony acid) combines with potash, forming a solid salt, which is safely excreted. Otherwise it is deposited in some part of the system, producing rheumatism, stone, gravel, gout, and other chronic and exceedingly troublesome diseases. The potash required for the purpose exists in several conditions: First, in its uncombined state as caustic potash. This is poison, for the simple reason that it combines so vigorously with organic matter that it would decompose the digestive organs themselves if presented to them. The lower carbonate is less caustic, the bicarbonate nearly, but not quite, neutral. Even this, however, should not be taken as food, because it is capable of combining with the acid constituents of the gastric juice.

The proper compounds to be used are those which correspond to the salts existing in the juices of vegetables and flesh, namely: compounds of potash with *organic* acids, such as tartaric acid, which forms the potash salt of the grape; such as citric acid, with which potash is combined in lemons and oranges; malic acid, with which it is combined in apples and many other fruits; the natural acids of vegetables generally; lactic acid in milk, etc. All these acids and many others of similar origin, are composed of carbon, oxygen, and hydrogen, held together with such feeble affinity that they are easily dissociated or decomposed by heat. This may be shown by heating some cream of tartar or tartaric acid on a strip of metal or glass. It will become carbonized to a cinder, like other organic matter. If the heat is raised sufficiently, this cinder will all burn away to carbonic acid, and water

in the case of pure acid, or will leave carbonate of potash in the case of cream of tartar or other potash salt.

This represents violently what occurs gradually and mildly in the human body, which is in a continuous state of slow combustion so long as it is alive. The organic acids of the potash salts suffer slow combustion, give off their excess of carbonic acid and water to be breathed out, evaporated, and ejected, leaving behind their potash, which combines with the otherwise stony lithic acid tormenter just when and where he comes into separate existence by the organic actions which effect the above-described slow combustion.

If potash be taken in combination with a mineral acid, such as the sulphuric, nitric, or hydrochloric no such decomposition is possible; the bonds uniting the elements of the mineral acid are too strong to be sundered by the mild chemistry of the living body, and the mineral acid, if separated from its potash base, would be most mischievous, as it precipitates the lithic acid in its worst form. For this reason all free mineral acids are poisons to those who have a lithic acid diathesis; they may even create it where it did not previously exist. Hence the iniquity of cheapening the manufacture of lemonade, ginger-beer, etc., by using dilute sulphuric or hydrochloric acid as a substitute for citric or tartaric acid.

Speaking generally, it is not to the laboratory of the chemist that we should go for our potash salts, but to the laboratory of Nature, and more especially to that of the vegetable kingdom. They exist in the green parts of all vegetables. This is illustrated by the manufacture of commercial potash from the ashes of the twigs and leaves of timber trees. The more succulent the vegetable the greater the quantity of potash it contains, though there are some minor exceptions to this. We extract and waste a considerable portion of these salts when we boil vegetables and throw away the *potage*, which our wiser and more thrifty neighbors add to their every-day menu. When we eat raw vegetables, as in salads, we obtain all their potash.

Fruits generally contain important quantities of potash salts, and it is upon these especially that the possible victims of lithic acid should rely. Lemons and grapes contain them most abundantly. Those who cannot afford to buy these as articles of daily food may use cream of tartar, which, when genuine, is the natural salt of the grape.

Intimately connected with this subject is another vegetable principle—vegetable jelly, or *pectin*; the jelly of fruits, of turnips, carrots, parsnips, etc. Frey has named it *pectose*. It is so little changed by cookery that an acid may be separated from it which has been named "pectic acid," the properties and artificial compounds of which appear to suggest the theory that the natural jelly of fruits largely consists of pectites of potash or soda or lime. We all know the appearance and flavor of current jelly, apple jelly, etc., which are composed of natural vegetable jelly plus sugar.

The separation of these jellies is an operation of cookery, and one that deserves more attention than it receives. W. Mattieu Williams says: "I shall never forget the *rahat lakoum* which I once had the privilege of eating in the kitchen of the seraglio of Stamboul, in the absence at the summer palace of the sultana and the other ladies for whom it was prepared. Its basis was the pure pectose of many fruits, the inspissated juices of grapes, peaches, pineapples, and I know not what others. The sherbet was similar, but liquid."

Mr. Gladstone's advocacy of the extension of fruit culture should be remembered. We shame-

fully neglect the best of all food in eating and drinking so little fruit. As regards cooked fruit, "jam for the million, jelly for the luxurious, and juice for all." With these in abundance, the abolition of alcohol will follow as a necessary result of natural nausea.

WASTE OF THE BODY.—Seguin inclosed himself in a bag of glazed taffeta which was tied over him, no other opening than a hole corresponding to his mouth, the edges of which were glued to his lips. He carefully weighed himself before and after his inclosure. He found that the largest quantity of insensible exhalations from the lungs and skin together amounted to three and a half ounces per hour, or five and a quarter pounds per day; the smallest quantity was one pound fourteen ounces; and the mean, three pounds and eleven ounces. Three-fourths of this was cutaneous.

Valentin found that his hourly loss by cutaneous exhalation, while sitting, amounted to 32.8 grams, or rather less than one and a quarter ounce. On taking exercise, with an empty stomach in the sun, the hourly loss increased to 89.3 grams, or nearly three times as much. After a meal followed by violent exercise, with the temperature of the air at 72° Fahrenheit, it amounted to 132.7 grams, or nearly four and a half times as much as during repose. A robust man, taking violent exercise in hot weather, may give off as much as five pounds in an hour.

The third excretion from the skin, the epithelial or superficial scales of the epidermis, is small in weight, but it is solid, and of similar composition to gelatin. It should be understood that this increases largely with exercise.

STRENGTH, OR WORK FORCE, OBTAINED FROM FOOD.—A practical dietary or *menu* seems to be demanded, say, for athletes in full work, another for sedentary people doing little work of any kind.

According to the results from the experiments by Joule and Frankland, the best possible food for the first class is fat, butter being superior to lean beef in the proportion of 14.421 to 2.829 (Smith), beef-fat having nearly eight times the value of lean beef. Ten grains of rice give 7.454 foot pounds of working power, while the same quantity of lean beef gives only 2.829; according to which one pound of rice should supply as much support to hard workers as two and a half pounds of beef-steak.

THE POSSIBLE FOOD SUPPLY.—The productive agricultural area of the world is 46,000,000 square miles, of which 28,000,000 are fertile enough to produce 25 bushels of wheat per acre. The estimated population of the world is 1,468,000,000. The known productive area of the world would feed nearly 6,000,000,000, or nearly four times the present population, without any increase in the present inferior product, which, if doubled by good cultivation, would be sufficient for a population of 12,000,000,000, or more than eight times the present number of the human race. A distinguished gentleman in a recent address before the British Association, after expressing his acceptance of the above estimates as reliable, argued that there is no room at present for the fear that population will overtake the production of food, and that farmers will enjoy the privilege of putting their own price upon their products. On the contrary, he thinks that production will, for a long time to come, be actually in advance of the requirements of the population.

FOOLS, FESTIVAL OF, a mediæval Christian feast, simulating the saturnalia, celebrated in many countries of Europe, but particularly in France. It fell chiefly on the 1st of January in each year, but more or less occupied the whole period be-

tween Christmas and Epiphany. In its observance, the chief performers were of the lower clerical orders, and the professed aim was to interest the young and the ignorant in the Advent, but it became a mere travesty of all the more sacred rites of Christianity, and was condemned by prelates and councils.

FOOL'S PARSLEY, an umbelliferous plant, a common poisonous weed in gardens and fields in most parts of Europe. It resembles parsley in its foliage and general appearance, so that serious accidents have occurred from its being mistaken for that herb.

FOOT: in music, a term used in the same way as in poetry, denoting a sort of melodic figure of notes with only one accent. Foot is also used in speaking of the pitch of sounds. The Germans have always used the word *Fusston* in representing the pitch of the different stops of an organ. As a unison stop is called an eight-foot stop, because in this case the pipe is about eight feet long, an octave stop is called a four-foot stop, a double or suboctave stop a 16-foot stop, etc.

FOOTE, ANDREW HULL (1806-63), a U. S. naval officer. He entered the navy as midshipman in 1822, became lieutenant in 1830, and in 1849 was made captain. At the beginning of the civil war he was put in command of the Western flotilla. In 1862 he received a vote of thanks from Congress for services rendered, and was made rear-admiral. In the following year he was chosen to succeed Rear-Admiral Dupont; but while on his way to assume command of the fleet, which was off Charleston, he died of a wound received a year previous.

FOOTE, HENRY STUART (1800-80), a U. S. Senator. He was admitted to the bar in 1822; acquired an extensive practice in Jackson, Miss., and in 1844 was a Presidential elector. From 1847 to 1852 he was a U. S. Senator, and then served as governor of his State till 1854. He was subsequently a member of the Confederate Congress. After the civil war Gen. Grant made him superintendent of the U. S. Mint at New Orleans. He held this position till shortly before his death.

FOOTE, SAMUEL AUGUSTUS (1780-1846), a U. S. Senator. He served in the Connecticut legislature for several years, and in 1819-21, and again in 1823-25, was a member of Congress. In 1827-33 he occupied a seat in the U. S. Senate. He was again in Congress in 1833-34, and then was governor of Connecticut for one term. In 1844 he was a Presidential elector.

FOOTE, WILLIAM HENRY (1794-1869), an American Presbyterian clergyman. He was licensed to preach in 1818, and in 1824 was ordained pastor of the church at Romney, W. Va. In 1838 he became agent of the central board of foreign missions of the Presbyterian church. From 1845 to 1861 he was again pastor at Romney, and superintendent of the academy. In the latter year he was chosen agent for Hampden-Sidney College.

FOOT-WASHING (see MAUNDY THURSDAY, Britannica, Vol. XV, pp. 635-36). The washing of feet, as a religious ceremony, is regularly practiced by the Dunkers and the Winebrennarians or Church of God, to commemorate Christ's washing of the feet of his disciples as recorded in John 13:4-17.

FORAGE, hay, straw, and oats, supplied to horses of officers and soldiers in the army. Where troops are together the provisions of forage devolves on the commissariat. Officers of the staff, etc., who are entitled to horses, but whose duties are at stations where bodies of horses are not collected, receive a money allowance, in lieu of forage.

in kind, varying according to the place and price of provender.

FORAGE CROPS. See GRASSES, in these Revisions and Additions.

FORAKER, JOSEPH BENSON, ex-governor of Ohio, born in 1846. He entered the army when sixteen years of age, and served to the end of the war. He attained the brevet rank of captain, and when his regiment was mustered out he was aid on Gen. H. W. Slocum's staff. In 1869 he was admitted to the bar, and from 1879 to 1882 was judge of the Cincinnati superior court. He was governor of Ohio from 1886 to 1890.

FORAMEN: in anatomy, any natural opening through a bone, especially a nerve-passage.

FORBES, ARCHIBALD, an eminent journalist, born in Morayshire, Scotland, in 1838, and educated at Aberdeen. He served some years in the Royal Dragoons. He was correspondent of the *Daily News* through the Franco-Prussian war, during the Prince of Wales's Indian tour, and in the Russo-Turkish and South African campaigns. In 1879 he rode 110 miles in 15 hours to report the victory of Ulundi. He has published a number of books detailing his experiences, and has lectured in Great Britain, America and Australia.

FORCE, PETER (1790-1868), an American historian. For a time he was foreman of a printing office in Bloomingdale, N. J., and in 1812 was president of the New York Topographical Society. In 1815 he removed to Washington, D. C. Here he was engaged in the publishing business, and from 1823 to 1830 edited and published the "National Journal." In 1833 he was authorized by Congress to compile a vast work, to be called the *American Archives, a Documentary History of the English Colonies in North America*, covering a period from the discovery of America to the final ratification of the Constitution of the United States. About one-fourth of Mr. Force's work was completed when it was discontinued by Secretary Marcy. His collection of material was sold to Congress for \$100,000. He published other works of historical importance. In 1836-40 he was mayor of Washington.

FORCENÉ, said, in heraldry, of a horse when rearing, or standing on his hind legs.

FORCING: in gardening, the artificial application of heat to accelerate vegetation. Many of the fruits and vegetables which grow well in the open air are very commonly forced in order that they may be procured at seasons when they could not be without artificial means.

FORD, FORDING. When a river or rivulet is crossed without the aid of either a bridge or ferry it is said to be forded, and an established place for this crossing is called a ford. To the military engineer and the traveler in wild countries, the selection of the safest place for fording a river is a matter of some practical importance. The widest part of the river should be chosen, as, wherever a certain quantity of water is flowing, the wider its bed, the rapidity of the flow being the same, the more shallow it must be.

FORD, MELBOURNE H., a lawyer, born in Saline, Mich., June 30, 1849. He was educated at the Michigan Agricultural College and the United States Naval Academy; served in the United States Navy during the latter part of the civil war; entered the profession of law in 1878, and was for several years official stenographer of different Michigan courts. In politics a Democrat, he was elected a member of the State legislature in 1885 and 1886. He was elected a representative from the Fifth Congressional District of Michigan to the 50th, and in 1890 was elected from the same District to the 52d Congress.

FORDHAM, 10 miles from Grand Central Depot, New York, was in 1874 annexed to that city. It contains St. John's College, a Roman Catholic theological school, academy for ladies, female deaf-mute asylum, and other educational institutions.

FORE, a term applied to the front or foremost part of a ship. The *forecastle* is that portion of the upper deck extending from the foremast to the bow. The *forehold* is that part of the hold intervening between the cutwater and the foremast. *Foremast* is the first of the three masts. The *fore-braces* are ropes passing from the extremities of the foreyard into the maintop, whence they descend through pulleys to the deck, where they serve, when necessary, to alter the direction presented by the foresail to the wind.

FOREKNOWLEDGE, knowledge that precedes the occurrence of the thing known; the absolute knowledge, or the omniscience of God.

FORELAND, North and South, two promontories of England, on the east coast of Kent, between which are the Downs and Goodwin Sands. North Foreland, in lat. 51° 22' N. and long. 1° 28' E., consists of chalky cliffs, nearly 200 feet high, upon which is erected a light-house 85 feet high. South Foreland, 16 miles south of North Foreland, in lat. 51° 8' N., 1° 22' E., also has a light-house.

FOREST-FLY, or HORSE-FLY, a dipterous insect, parasitic on horses, oxen, etc., frequent in forests. It is a small insect, about four lines long, of a shining brown color, with some yellow. The insect passes the larval stage and becomes a pupa within the mother.

FOREST MARBLE, a member of the Lower Oolite. The principal bed is a fissile limestone, containing large numbers of dark-colored shells, and capable of sustaining a fine polish. On this account it is used to some extent as "marble." It is interstratified with blue marls and shales, and fine oolitic sandstones. The whole thickness of the group seldom exceeds forty feet.

FOREST OAK, a name sometimes given in commerce to the timber of *Casuarina torulosa*, and other species of *Casuarina*, Australian trees. This timber, which is a light yellowish-brown, and prettily marked with short red veins, is used for ornamental work.

FORESTRY. On Jan. 1, 1891, the forest area in the United States was, according to a careful estimate made by the chief of the Forestry Division, United States Department of Agriculture, 481,764,599 acres. The present annual requirements for consumption of forest products in the United States are, approximately, over 20,000,000,000 cubic feet, made up of the following items: Lumber market and manufactures, 2,500,000,000 cubic feet; railroad construction, 500,000,000 cubic feet; charcoal, 250,000,000 cubic feet; fences, 500,000,000 cubic feet; fuel, 17,500,000,000 cubic feet; mining timber, 150,000,000 cubic feet. In addition to these items of consumption, forest fires annually destroy the products of hundreds of thousands of acres of forest. At the present rate of destruction, therefore, the remainder of forest land in the United States cannot long meet the enormous demands on its resources. Some of the most important timbers for building purposes are already practically extinct, such as the merchantable white pine of the Northwest and of New England, while of the long-leaf pine of the South only about 1,500,000,000 cubic feet remain.

Various measures have been adopted for the preservation of the forests. In 1885 the State of New York instituted a Forest Commission, with extensive powers. California, Colorado, and New

Hampshire have also created Forest Commissions, while Ohio, Kansas, and Pennsylvania have Forestry Bureaus. For several years a national organization, known as the American Forestry Association, composed of delegates from each of the States, has met annually, the ninth annual meeting having been held at Washington, D. C., in December, 1890. In order to encourage forest planting on the treeless prairies of the West, the Timber Culture act, of the United States provides that a citizen, or one who has declared his intention to become such, if the head of a family, or a single person over twenty-one years of age, may acquire title to 160 acres of the public domain, on cultivating 10 acres of trees thereon for eight years. That this enactment has not been barren of results will appear from the following statement of the number of acres entered annually under the Timber Culture act, from July 1, 1872 to June 30, 1890, inclusive:

Year ending June 30.	Acres.	Year ending June 30.	Acres.
1873	50,246	1883	2,546,686
1874	81,226	1884	3,110,930
1875	473,694	1885	4,081,464
1876	599,918	1886	4,755,006
1877	524,552	1887	5,391,309
1878	1,902,038	1888	4,224,337
1879	2,775,038	1889	3,735,305
1880	2,169,484	1890	2,551,069
1881	1,763,793	1891	1,797,403

In 1874 the Nebraska State Board of Agriculture recommended that the second Wednesday of April in each year be designated as a day to be dedicated to the planting of trees. The suggestion was adopted, and since then no less than 37 of the States and Territories have, by legislative enactment or otherwise, set apart a day to be annually devoted to tree-planting, known as Arbor Day. Latterly the interest in this annual observance has been greatly augmented by inducing the pupils of the public schools to take part in its celebration.

INFLUENCE OF FORESTS ON WATER SUPPLY.—That forests increase the rainfall of a region is now generally conceded. In the annual report of the Secretary of Agriculture for the year 1889, the Chief of the Forestry Division says that the water capital of the earth consists of fixed capital and circulating capital. The first is represented not only in the waters on the earth, but also by that amount of water which remains suspended in the atmosphere, being part of the original atmospheric water masses which, after the rest had fallen to the cooled earth, remained suspended and is never precipitated. The circulating water capital is that part which is evaporated from water surfaces, from the soil, from vegetation, and which, after having temporarily been held by the atmosphere in quantities locally varying according to the variations in temperature, is returned again to the earth by precipitation in rain, snow and dew. There it is evaporated again, either immediately or after having percolated through the soil and been retained for a shorter or longer time before being returned to the surface; or, without such percolation, it runs through open channels to the rivers and seas, continually returning in part into the atmosphere by evaporation. Practically, then, the total amount of water capital remains constant; only one part of it—the circulating capital—changes in varying quantities its location, and is of interest more with reference to its local distribution, and the channels by which it becomes available for human use and vegetation, than with reference to its practically unchanged total quantity.

As to the amount of this circulating water capital we have no knowledge; hardly an approximate estimate of the amount circulating in any given lo-

cality is possible with our present means of measurement; for it appears that so unevenly is the precipitation distributed that two rain-gauges almost side by side will indicate varying amounts, and much of the moisture which is condensed and precipitated in dews escapes observation or at least measurements entirely. Thus it occurs that while the amount of water calculated to be discharged annually by the River Rhone into the sea appears to correspond to a rain-fall of 44 inches, the records give only a precipitation over its water-shed of 27.6 inches.

The distribution of the circulating water capital is influenced by various agencies. The main factor which sets the capital afloat is the sun, which, by its heat and the air currents caused by it, and by the rotation of the earth, produces the evaporation which fills the atmosphere with vapor. Anything, therefore, that influences the intensity of insolation, the action of the sun, or obstructs the passage of winds, must influence the local distribution of the water capital. The great cosmic influences which produce the variability of all climatic conditions, and therefore also of the circulating water capital, are the positions of the earth's axis to the sun, by which the angle and therefore the heat value of the sun's rays vary in different parts of the earth and at different times of the year; the distribution of land and water areas, which produces a difference of insolation because the water has less heat capacity than the land, and which also influences the direction of air and sea currents; and the configuration of the earth, by which the density of the atmosphere is made unequal, and in consequence of which differences of insolation and of air temperature are induced. Thus we have not only climatic zones, but also continental climates and mountain climates, in opposition to coast climates and plains or valley climates. Among the factors which modify the cosmic climate and help to produce a local climate differing from other local climates, the soil-cover, especially the presence of forest areas, is one that, under certain conditions, is potent.

In the discussions which have prevailed hitherto it has been overlooked that the idea of what constitutes a forest is not only an exceedingly variable one, but that without a definite understanding of what constitutes the forest we cannot discuss its influence. It is clear that the influence of the forest, if any, will be due mainly to its action as a cover protecting soil and air against insolation and against winds. That the nature of a cover, its density, thickness, and its proper position, has everything to do with the amount of protection it affords will readily be admitted. A mosquito net is a cover, so is a linen sheet or a woolen blanket, yet the protection they afford is different in degree and may become practically none. It will also be conceded that it makes a great difference whether the cover be placed before or behind the wind. Just so with the influence of the forest; it makes all the difference whether we have to do with a deciduous or a coniferous, a dense or an open, a young low or an old high growth, and what position it occupies with reference to other climatic elements, especially to prevailing winds and water surfaces. In this discussion, unless differently stated, when the word forest is used a dense growth of timber is meant.

The question of forest influence on water supplies can be considered under three heads, namely, influence upon precipitation or distribution of atmospheric water; influence upon conservation of available water supplies, and influence upon the distribution or "run-off" of these supplies.

INFLUENCE UPON PRECIPITATION: New evidence is constantly accumulating which shows that under certain conditions forest areas obtain larger precipitations than open grounds—that is, they increase at least the amount of precipitation over their own immediate and near-lying areas. Of the prominent meteorologists who believe in such an influence, is the well known Russian, Dr. A. Woeikoff, from whose latest publication, *Climates of the Earth*, published in the Russian language, we quote:

It would appear as if in winter the difference in the amount of rainfall within and without the woods cannot be great, as the absolute amount of vapor is small and the difference between the relative humidity within and without the woods is insignificant. This is, however, not the case, for two reasons: First, the clouds float in winter at a lower level than in summer, hence the mechanical resistance presented by the woods is more effective in winter, as it can more easily reach the strata of the atmosphere in which the clouds are moving. This resistance causes the air to rise and thus favor the formation of precipitation. Secondly, in winter the prevailing winds are generally charged with moisture and precipitation is of longer duration, so that the above-named causes act for a longer time.

In the spring and beginning of winter the woods contribute more or less to the increase of precipitation. At this time of the year evaporation is very actively going on outside the woods on the surface of the meadows and fields. During the winter the soil has been well stocked with moisture, which is now evaporated by the action of the processes of vegetable life and the direct action of the sun. It is probable that during this period both the possible and the actual evaporation are greater without than within the forest, evaporation being here understood as the sum of all water evaporated both by the soil and the plants from a given area.

In the middle of summer or toward the beginning of autumn the soil outside the woods begins partly to dry up, and cannot any more yield as much moisture for the evaporation of the plants as in the beginning of summer; on the other hand, the vegetable processes following upon the blooming (the ripening of the seeds) require less moisture. But in the leaved woods evaporation continues in full force to the end of the summer, and in coniferous woods the evaporating surface remains approximately the same in the course of the whole year; at the same time the moisture preserved in the soil through shade and protection from wind continues to furnish sufficient material for evaporation. Consequently, just at the time when meadows and fields begin to evaporate less, it goes on as before in the forests. This gives rise to a great difference between the amount of moisture contained in the air within and near the woods, and outside the woods in open places. Moist air more easily reaches the point of saturation and condensation than dry air.

The following point is also to be noticed. Forests, especially pine woods, must condense a great deal of moisture in winter when air nearly saturated with vapor passes over them; this gives rise to copious formations of hoarfrost, which will fall to the ground and increase the mass of snow in the woods. This phenomenon has never been accurately observed and measured; but careful observation will convince anybody that wherever the temperature for several consecutive months remains below zero (as is the case in Northern Europe), a considerable amount of hoarfrost is in this way collected, since the air is highly charged with moisture, and besides, the average force of the wind is greater in winter than in any other season.

In hot and moist climates, where the absolute amount of vapor in the air is great (for instance in many tropical countries), the enormous surface presented by the leaves of forest trees condenses a great quantity of water on every clear and calm night, so that this water cannot be retained on the leaves and falls to the ground; the observer gets the impression of a heavy rainfall. This was specially pointed out by the celebrated Boussingault, who observed it in South America. Thus, a certain part of the moisture evaporated by the leaves during the day returns at night, and the dew is so copious as to moisten the soil under the trees.

Dr. Woeikoff then goes on to show that in tropical and sub-tropical countries the presence of woods has a far greater influence in mitigating the temperature during the hot and dry months of April and May than the proximity of the sea.

Without further discussing the influence of the forest upon quantity and distribution of rainfall, it may be said that many observations and the philosophy of meteorological forces lend countenance to the following statements:

(1) During the time of vegetation large quantities of vapor are transpired and evaporated by a forest, by which the absolute humidity of the air above the forest is increased; and since, on ac-

count of the cooler temperature which prevails over and within a forest, the relative humidity is also greater, the tendency to condensation is increased.

(2) This moister and cooler air stratum communicated to the neighboring locality must increase the dew, at least, over the neighboring field.

(3) This relatively moister air stratum, carried away by air currents, has the tendency to induce precipitation at such places, especially where the additional influence favorable to precipitation—namely, increased altitude—exists; therefore,

(4) While the forest may not everywhere increase precipitation over its own area, yet a large system of forests over an extensive area will influence the quantity of precipitation over and within this area.

(5) It must never be overlooked that there are certain rain conditions prevailing in climatic zones (rainy or rain-poor localities, with periodical, seasonal, or irregular rains) which are due to cosmic influences and cannot be altered, but may be locally modified by forest cover. Hence, experiences in one climatic zone cannot be utilized for deductions in another.

DISPOSAL OF WATER SUPPLIES: Given a certain amount of precipitation in rain or snow over a certain area, the disposal of the water after it has fallen and the influence of the forest cover on its disposal require our attention. For the sake of convenience the elements which need consideration may be divided into elements of dissipation, elements of conservation, and elements of distribution. The difference in effect between the first two classes of elements will give an idea of the amount of available water supply or run-off resulting from precipitation; while the third class bears upon the methods of distributing the available water supply.

Elements of dissipation are those which diminish the available water supplies; they are represented in the quantity of water which is prevented by interception from reaching the ground, in the quantity dissipated by evaporation, in the quantity used by plants in their growth, and in transpiration during the process of growing. The amount of rainfall and snow which is prevented by a forest growth from reaching the soil varies considerably according to the nature of the precipitation and to the kind of trees which form the forest, as well as to the density and age of the growth. A light drizzling rain of short duration may be almost entirely intercepted by the foliage and at once returned to the atmosphere by evaporation; if, however, the rain continues, although fine, the water will run off at last from the foliage and along the trunks. This amount, of which the rain-gauge takes no account, represents, according to measurements of the Austrian stations, from 8 to 14 per cent.; thus reducing considerably the loss to the soil.

While the careful measurements at the Swiss stations in a 12 years' average show the interception in a larch forest as 15 per cent., in a spruce forest 23 per cent., in a beech growth 10 per cent.; the figures for the Prussian stations are, for beech growth, 24 per cent., and for spruce at various stations 22 per cent., 27 per cent. and 34 per cent., respectively. Altogether, for the rainfall conditions of the countries cited, a dense forest growth will, on the average, intercept 23 per cent. of the precipitation; but if allowance be made for the water running down the trunks, this loss is reduced to not more than 12 per cent.

The amount of interception in the open growths which characterize many of our western forest areas would be considerably smaller, especially as

the rains usually fall with great force, and much of the precipitation is in the form of snow. Although branches and foliage catch a goodly amount of this, the winds usually shake it down, and consequently but very little snow is lost to the ground by interception of the foliage.

There is also a certain amount of water intercepted by the soil cover and held back by the soil itself, which must be saturated before any of it can run off or drain away. This amount, which is eventually dissipated by evaporation and transpiration, depends, of course, upon the nature of the soil and its cover, especially upon their capacity to absorb and retain water.

The loss by evaporation, after the water has reached the ground, depends, in the first place, upon the amount of direct insolation of the soil; hence its temperature, which again influences the temperature of the air. If the loss by evaporation from an open field be compared with that of a forest-covered ground, it will, as a matter of course, be found to be less in the latter case, for the shade not only reduces the influence of the sun upon the soil, but also keeps the air under its cover relatively moister, therefore less capable of absorbing moisture from the soil by evaporation. In addition, the circulation of the air is impeded between the trunks; and this influence upon available water supply—the wind-breaking power of the forest—must be considered as among the most important factors of water preservation. Especially is this the case on the Western plains, and on those Western mountain ranges bearing only a scattered tree growth, and where, therefore, the influence of shade is but nominal.

The evaporation under the influence of the wind is dependent not only on the temperature and dryness of the same, but also on its velocity, which, being impeded, the rate of evaporation is reduced. Interesting experiments for the purpose of ascertaining the changes in the rate of evaporation effected by the velocity of the wind were made by Prof. T. Russell, Jr., of the United States Signal Service, in 1887. These experiments were made with Piche's hygrometers whirled around on an arm 28 feet in length, the results of which were compared with those from a tin dish containing 40 cubic centimeters of water exposed under shelter. These results were obtained: with the temperature of the air at 84 degrees and a relative humidity of 50 per cent., evaporation at 5 miles an hour was 2.2 times greater than in a calm; at 10 miles, 3.8; at 15 miles, 4.9; at 20 miles, 5.7; at 25 miles, 6.1; and at 30 miles the wind would evaporate 6.8 times as much water as a calm atmosphere of the same temperature and humidity. As the average velocity of the winds which constantly sweep the Western sub-arid plains is from 10 to 15 miles, not rarely attaining a maximum of 50 and more miles, the cause of the aridity is not far to seek, and the function of the timber belt, or even simple wind-break, can be readily appreciated.

The degree of forest influence upon rate of evaporation by breaking the force of winds is dependent upon the extent and density of the forest, and especially on the height of the trees; for according to an elementary law of mechanics, the influence which breaks the force of the wind is felt at a considerable elevation above the trees. This can be practically demonstrated by passing along a timber plantation on the wind-swept plains. Even a thin stand of young trees not higher than five feet will absolutely calm the air within a considerable distance and height beyond the shelter.

The following extract from the letter of a farmer in Illinois to the United States Secretary of Agri-

culture indicates the actual experience of the Western farmers in regard to the value of wind-breaks on the prairies and plains:

My experience is, that now in cold and stormy winters wheat protected by timber belts yields full crops, while fields not protected yield only one-third of a crop. Twenty-five or thirty years ago we never had any wheat killed by winter frost, and every year a full crop of peaches, which is now very rare. At that time we had plenty of timber around our fields and orchards, now cleared away.

The damage done to crops by the cold, dry winter winds is mainly due to rapid evaporation, and plants are liable to suffer as much by winter drought as by summer drought. Rationally disposed timber belts alone will do much to increase available water supply by reducing evaporation.

Various experiments comparing the rate of evaporation within and without a forest are recorded in the following table, which refers to evaporation from a water surface in the open field on the one hand and within the shelter of the forest on the other. It is shown that under ordinary circumstances evaporation may, under forest cover, be decreased from two to three times.

Evaporation of a water surface from April to October, expressed in centimeters:

District.	Without the Forest.	Within the Forest.	Ratio.
Eastern France.....	41.2	13.2	312 to 100
Alsatian Mountains.....	33.5	15.9	211 to 100
Bavaria.....	37.7	15.8	239 to 100
Brandenburg.....	29.9	16.3	245 to 100
Silesian Mountains.....	25.7	10.6	250 to 100
Eastern Prussia.....	25.2	12.0	210 to 100

The reason for this influence of the forest, as has been stated, is due not only to the impeded air circulation, but also to the temperature and moisture conditions of the forest soil and forest air. The greater humidity of the atmosphere under forest cover tends also to reduce evaporation. The temperature, especially during the warm months, being considerably lower in the forest interior, the air receives less moisture in proportion from the soil and lower vegetation. A cubic foot of forest air contains in the average less moisture than a cubic foot of air over a cultivated field under otherwise similar conditions. While thus the absolute amount of moisture in the forest air is really less, the relative humidity is greater; that is, the air of the forest being of lower temperature is nearer the state of saturation.

All vegetation takes up a certain amount of water, a part of which is consumed in building up its body, and a still larger part returned to the atmosphere by transpiration during the process of growth. The quantity of water so used is as variable as the amount of precipitation, and, in fact, within certain limits depends largely upon it. That is to say, a plant will transpire in proportion to the amount of water which is at its disposal. Transpiration is also dependent on the stage of development of the plant, on the nature of its leaves and amount of its foliage, on temperature, humidity, and circulation of the air, on intensity of the sunlight, and on temperature and structure of the soil, and other meteorological conditions. Rain and dew reduce transpiration, wind increases it. The amounts transpired by agricultural crops and other low vegetation, weeds, etc., are exhibited in

the following table, which gives the results of the latest investigations by Wollny:

Agricultural crops.	Time of vegetation.	Water consumption per acre.
		Pounds.
Winter rye.....	April 20-Aug. 3, 1879	2,590,186
Barley.....	April 20-Aug. 3, 1879	2,720,238
Peas.....	April 20-Aug. 3, 1879	3,144,128
Red clover (1st season)	April 20-Oct. 1, 1879	3,070,012
Summer rye.....	April 20-Aug. 14, 1880	3,000,486
Oats.....	April 20-Sept. 14, 1880	3,422,584
Beans.....	April 20-Sept. 10, 1880	3,139,293
Red clover (2d season)	April 20-Oct. 1, 1880	4,109,198

Since this water is given off again to the atmosphere in the locality where it has fallen—thus re-enriching the atmospheric moisture—it may be considered as part of the circulating water capital, which does its duty in producing useful substance and in conserving moisture for the locality.

There is one other element of conservation effecting water supplies which requires special mention. This is the retardation in the melting of the snow which is due to forest-cover. According to Dr. Buehler, of Zurich, this retardation in Switzerland amounts to from five to eight days in general, and may, according to weather conditions, be several weeks, thus giving a longer period for distribution. The evergreen coniferous forest in this respect naturally does better service than the deciduous one.

ELEMENTS OF DISTRIBUTION.—The distribution or “run-off” of the available water supply is almost as important a factor, and often more important, in the economy of the water than the quantity of available supply itself, and the manner in which this takes place influences considerably the ultimate availability of the supply for human use. There are two methods of distribution or run-off; namely, the superficial or surface run-off and the underground run-off, resulting in springs which eventually change into open runs, brooks, and rivers.

The water capacity of soils and soil-covers has been referred to as an element of interception. With reference to the run-off, this capacity becomes influential in determining the manner of run-off. As soon as the soil-cover and upper soil strata are saturated, and especially when the latter are impermeable and the rain continues, either no water or only a small part gradually can find entrance into the soil, and the run-off becomes superficial, or, if the ground be not sloping, stagnant water results. For every forest there is, therefore, a time when the superficial run-off would be no more impeded than from an open field of similar conditions but for the retardation by the trunks, underbrush, and roots. This time, however, occurs later in the forest than on the unforested and especially naked soil, because the water capacity of the soil-cover as well as of the protected soil, is greater than that of the naked soil or that covered with field-crops.

Since the forest-cover has a tendency to preserve the granular porous structure of the soil, which is favorable to filtration, and as, moreover, the roots furnish channels for unimpeded drainage, it must have the tendency, other things being equal, to allow a more rapid filtration than the naked, mostly compacted soil. The temperature appears to have an influence favorable to rapid filtration in the forest; for, according to Pfaff, in the field during winter three-quarters of the precipitation will sink to two feet depth in the soil, and not more than ten to thirty per cent. in summer.

With regard to the superficial run-off, without any evidence furnished by experiments, we can at once understand that it is impeded by any kind of mechanical obstruction, such as is offered by the vegetation of a meadow or forest. The great number of inequalities which the forest floor offers, in addition to the trunks and stumps and fallen trees, subjects the run-off to many detours, thus retarding its flow and its collection in the open runs and brooks. This retardation is increased by the mechanical obstruction which the crowns of the trees exert upon the rainfall. Every leaf, every twig breaks the force and retards the fall of the raindrops, allowing those fallen before to penetrate the soil. The devious ways in which it reaches the soil make the flow of water from a forest-covered hill longer in time than if the rain had fallen on a bare slope. This mechanical effect is further favorable to the penetration of water into the soil, as it prevents the rain from compacting the soil; preserving thereby its mellow condition, which is destroyed on the open field by the force of the raindrops. It also allows more time for the absorption of water by the soil. There is, in fact, no influence of the forest of more moment in the distribution of the available water supplies than the mechanical retardation of the “run-off,” while in the conservation of supplies the retarding influence upon evaporation is the potent one.

FOREY, ELIE FRÉDÉRIC, a French marshal, born at Paris, Jan. 10, 1804, died there June 20, 1872. He was educated at Dijon, graduated at the military school of St.-Cyr in 1822, and was engaged in the Algerine campaigns of 1830, 1835, and 1840, returning to France a colonel. He took an active part in the *coup d'état* of December, 1851, and was made general of division and commander of the Legion of Honor in 1852. In the war with Russia he was for a short time in command of the French forces before Sebastopol, and during the Italian war in 1859 defeated the Austrians at the battle of Montebello. Gen. Forey commanded the French expedition against Mexico, captured the city of Puebla, May 17, 1863, and entered the capital June 10. For these successes he was made a marshal. On his return to France he had command of an army corps and of the camp of Chalons.

FORFEITURE, a term in law which includes the various cases in which a person is penally deprived of property.

FORIO, or FORIA, a town of Italy, on the west coast of the island of Ischia, 16 miles southwest of Pozzuoli. Population, 6,407.

FORISFAMILIATION, the separation of a child from the family of his father. A child is said to be forisfamiliarized either when he marries or when he receives from his father a separate stock, the profits of which are enjoyed by himself, though he may still reside with his father. The same result is also brought about when a child renounces his legal share of the father's free movable property due to him on the death of the latter.

FORKED-BEARD, a gadoid fish (*Phycis blennioides*), found on the European coasts; so called from its barbules. The corresponding species of the United States, *P. chuss*, *P. tenuis*, and *P. regius*, are known as *hake* and as *codlings*.

FORLORN HOPE, a body of men selected to attempt a breach, or to lead in scaling the wall of a fortress. The name is given on account of the extreme danger to which the leaders of a storming party are necessarily exposed. As, however, the honor of success is proportionate to the peril of the undertaking, there is ordinarily no lack of volunteers for this arduous service. The for-

lorn hope is called by the Germans *Die verlorenen Posten*.

FORMA PAUPERIS, the phrase usually employed to signify the arrangement by which an action may be carried on by one who is too poor to sue in the ordinary way.

FORMATION: in geology, a term applied to a group of strata united by some character which they have in common, whether of age, origin or composition, as the coal or chalk formation.

FORMES, CHARLES JOHN (1810-90), a German singer. He appeared in various operas in Vienna, Hamburg and London, and gained a reputation as a bass singer of unequaled talent. In 1857 he came to the United States, and appeared with much success in the principal cities of the Union. After a time, his voice becoming impaired by frequent hoarseness, he retired from the operatic stage.

FORMIC ACID (CH_3O) derives its name from the circumstance of its having been first obtained from the *Formica rufa*, or red ant. In a concentrated state, it is a fuming liquor with an irritating odor, and occasions vesication if dropped upon the skin. It crystallizes at a temperature below 32° , and boils at about 212° , yielding a vapor which burns with a blue flame. It is a strong reducing agent, at a boiling temperature reducing the salts of silver, mercury, platinum and gold.

FORMING'S ISLAND is a speck on the bosom of the Pacific, lying a little to the north of the Sandwich Group, or Hawaiian Archipelago, in latitude $30^\circ 49' \text{ N.}$, and longitude $159^\circ 20' \text{ W.}$ It is one of the dependencies of the British Empire, having been formally occupied, mainly on account of its excellent harbor, toward the close of 1860.

FORMOSA (Chinese name *Tai-wan*), a large island on the southeast coast of China, opposite the Province of Fo-kien, from which it is distant about ninety miles. It lies between $21^\circ 53'$ — $25^\circ 16' \text{ N.}$ latitude, and $120^\circ 15'$ — $122^\circ 4' \text{ E.}$ longitude. Length, about 237 miles; average breadth, about 70 miles.

FORMOSA, a territory in the extreme north of Argentine Republic, formed in 1884, and bounded on three sides by the rivers Pilcomayo, Paraguay, and Bermejo. Estimated area, 44,490 sq. miles. Little is known, even by Argentinians, of the newly-formed territory, which is, however, described generally as a vast plain, gently sinking to the southeast, covered with forests, and in large sections liable to frequent inundations. The summer rains last from October to May. The capital is Formosa (1000 inhabitants), on the Paraguay, about 100 miles north-northeast of Corrientes.

FORNEY, JOHN WEISS (1817-81), an American journalist. In 1840 he published the *Lancaster, Pa., "Intelligencer and Journal,"* a Democrat paper, and in 1845 became surveyor of the port of Philadelphia. From 1851 to 1855 he was clerk of the House of Representatives, and in 1856 was elected chairman of the Pennsylvania Democratic State Committee. In 1859 he was again chosen clerk of the House of Representatives, and in 1861 became secretary of the U. S. Senate. In 1871-72 he became collector of the port of Philadelphia. He edited for a time the Philadelphia "Pennsylvania"; became editor of the Washington "Union" in 1851; of the Philadelphia "Press" in 1857; of the Washington "Chronicle" in 1859; and in 1879 of "The Progress" in Philadelphia.

FORNICATION (*fornicatio*) from *fornix*, an arch-vault, and by metonymy, a brothel, because brothels at Rome were in cellars and vaults underground. In most countries this crime has been brought

within the pale of positive law at some period of their history, and prohibited by the imposition of penalties more or less severe. In England, in 1650, the repeated act of keeping a brothel or committing fornication was made felony without benefit of clergy on a second conviction. Similar laws, of a most stringent character, were adopted by the Puritan founders of New England.

FORREST CITY, a town and the county-seat of St. Francis county, Ark. Population, 903.

FORRES, a royal burgh of Elginshire, 5 miles south of Findhorn village, on the Moray Firth, and 25 east-northeast of Inverness, with which and Nairn and Fortrose it returns a member to Parliament. On its Castle Hill, a royal residence from 1189 to 1371, stands an obelisk (1857), 65 feet high, to the Crimean hero, Dr. Thomson, of Cromarty; whilst on the wooded Cluny Hill are a hydropathic establishment, and the Nelson tower (1806), 70 feet high. Sueno's Stone is a remarkable sculptured monolith, ascribed by Skene to the year 900; the Witch's Stone recalls Macbeth's meeting with the weird sisters near Forres. Public buildings are the town-house, Falconer Museum, Mechanics' Institute, and Anderson's Institution. Population (1851), 3,468; (1881), 4,030.

FORREST, ALEXANDER, an Australian explorer, was born at Bunbury, Sept. 22, 1849. After taking part with his brother John in his journeys, he in 1879 started, along with Hill, to explore the north-western parts of the Australian continent, an expedition which resulted in the discovery of the fertile pastoral region now called Kimberley District. Besides being well watered, it was also seen to be suitable for the cultivation of such tropical harvests as sugar, coffee and rice. At the same time the river Fitzroy was ascended for a distance of about 250 miles. This journey was described in *Journal of an Expedition from the De Grey to Port Darwin* (1880).

FORREST, EDWIN, born in Philadelphia, March 9, 1806; died there Dec. 12, 1872. He made his theatrical debut as "Douglas" in Home's tragedy of that name, and traveled and performed in the theaters of the West and Southwest without attracting much notice. In November, 1826, he played a star engagement at the New York Bowery Theater, where he opened in the character of "Othello," which was pronounced a signal success. This was followed by other parts acted with no less ability. He left New York a prominent tragedian and a great favorite, to repeat his dramatic triumph in other cities of the Union. After playing for several years he visited Europe for recreation and study. He returned to the United States in 1831, and continued playing with unabated attraction until the autumn of 1836, when he sailed for Europe. His first appearance in England was as "Spartacus" in the *Gladiator*, which was followed by "Macbeth," "Lear" and "Othello." In London he married a daughter of John Sinclair, the popular Scottish vocalist, and in November of the same year began an engagement in Philadelphia. In 1845, in company with his wife, he again visited London and performed at the Princess's Theater. Much professional jealousy arose between Forrest and Macready, the favorite tragedian of the British stage, which led to open outbreaks of temper, in consequence of which the American actor lost the favor of the British public. In May, 1849, when Macready was playing in this country as "Macbeth" at the Astor Place opera house, a riot ensued. On this occasion twenty rioters were killed and thirty-six wounded. The actor's marriage with his British wife proved an unhappy one; divorce suits were brought on both sides, that occupied the courts for several

years, and were finally decided in the wife's favor. In 1853 Forrest performed at the Broadway theater for several weeks. In 1865 he became gouty, and one of his arms was slightly paralyzed. Forrest's trip to California in 1866 was unsuccessful. His last theatrical appearance was made at Boston in March, 1871, when he broke down during the engagement. Later, he endeavored to give readings from Shakespeare's plays, but they failed to attract.

FORREST, FRENCH, born in Maryland, in 1796, entered the United States navy at the age of 15 and took part as a midshipman in the battle of Lake Erie. He became captain in 1844, served in Mexico with credit, and in 1861 joined the Confederacy and was given a naval command. Afterward he became Assistant Secretary of the Confederate navy. He died in 1866.

FORREST, JOHN, C.M.G., F.R.G.S., F.G.S., F.L.S., Honorary Fellow of the Royal Geographical Societies of Italy, Vienna and St. Petersburg, Knight of the Italian Crown, entered the Survey Department of Western Australia, 1865, and in 1869 commanded an exploring expedition into the interior in search of Dr. Leichhart and party. In 1870 he commanded an exploring expedition from Perth to Adelaide along the South Coast, and proved the practicability of the country for a telegraph line, which was erected in 1876. In 1874 he commanded an exploring expedition from Champion Bay on the West Coast of Australia to the overland telegraph line between Adelaide and Port Darwin without the aid of camels, with horses only, a journey of nearly 2,000 miles. For these services he received the thanks of the Governor and the Legislative Council, and was awarded the gold medal of the Royal Geographical Society of London, May 22, 1876, and was also presented by the Imperial Government with a grant in fee of 5,000 acres of land. In 1876 he was appointed Deputy Surveyor-General of Western Australia. In 1878 and 1882 he conducted the Trigonometrical Surveys of the Nickol Bay District and the Gascoyne and Lyons District in Northwestern Australia. From September, 1878, to January, 1879, he acted as Commissioner of Crown Lands and Surveyor-General, with a seat in the Executive Council of the Colony. In 1880-81 he acted as Comptroller of the Imperial Establishments and Expenditure in Western Australia. He is a justice of the peace for the Colony. In 1882 he was made a Companion of the order of St. Michael and St. George. In 1883 he was appointed Commissioner of Crown Lands and Surveyor-General, and in the same year, and again in 1886, proceeded to Kimberley District, Northwest Australia, to report on it to the Government. He is a member of the Executive and Legislative Councils of the Colony; represented Western Australia at the Colonial Conference in London, 1887. He has published "Explorations in Australia," 1876; "Notes on Western Australia," 1883, 1884 and 1885.

FORREST, NATHAN BEDFORD, born in Tennessee, July 13, 1821; died Oct. 29, 1877. He became a planter and afterward a slave-dealer, and in June, 1861, raised a cavalry regiment for the Confederacy and was engaged at Fort Donelson, Shiloh, Murfreesboro and Chickamauga. Becoming a major-general, he commanded at the attack on Fort Pillow in April, 1864. The works were taken by assault and the colored troops of the garrison were mercilessly slaughtered, no quarter being given. Forrest was promoted lieutenant-general. Gen. J. H. Wilson defeated him in April, 1865, and he surrendered at Gainesville a month later. After the war he engaged in the railroad business.

FORREST, URIAH, born in Maryland in 1756, served in the Continental army and was wounded

at Germantown and the battle of the Brandywine. Subsequently he served in Congress and in the legislature of his native State. He died in 1805.

FORSHEY, CALEB G., born in Pennsylvania in 1812, studied at West Point and became an engineer. He had charge of U. S. surveys in Mississippi and Texas and was actively engaged in railroad construction for many years. During the civil war he served on the staff of General Magruder as chief engineer. After the close of hostilities he reengaged in railway work and contributed extensively to technical journals. He died in 1881.

FÖRSTER, ERNST JOACHIM, a German painter, and art-writer, born in Münchengossmstadt, Bavaria, April 8, 1800, died May 10, 1885. He studied theology and philosophy in the universities of Berlin and Jena, but in 1822 abandoned these to devote himself to painting under the instruction of Cornelius. He executed various fresco pieces in Bonn and Munich. In 1826 he visited Italy, and commenced researches in art-history, which he subsequently pursued in Germany, France, Belgium, and England. The results of his studies are embodied in the publications, *Letters on Painting* (1838); *History of German Art* (5 vols. 1851-60); *Monuments of German Architecture, Sculpture, and Painting* (12 vols. 1853-69); biographies of Fra Angelico, J. G. Müller, Raphael, and Cornelius. At the time of his death he left two large works unfinished, *A History of Italian Art and Monuments of Italian Painting*. In his researches in Italy he discovered several ancient pictures, notably frescoes of Avanzo in Padua, which he restored.

FÖRSTER, HEINRICH, a German prelate, born at Grossglogan, Silesia, Nov. 24, 1800, died Oct. 20, 1881. He was educated at the University of Breslau, was ordained priest in 1825, and was for a time chaplain at Liegnitz and afterwards pastor at Landshut. In 1837 he was attached to the cathedral at Breslau, and in 1853 was chosen to succeed Diepenbrock, prince-bishop of Breslau. He was strongly opposed to the doctrine of papal infallibility, but submitted when it was declared. It was largely due to Förster's efforts that the Prussian government was unsuccessful in its attempt to control ecclesiastical affairs, and for this reason he was suspended from his office in 1875. Among his published works are: *Homilien auf die Sonntage des Katholischen Kirchenjahres* (1851); *Der Ruf der Kirche in die Gegenwart* (1852); *Die Christliche Familie* (1854); and *Kanzelvorträge*.

FORSTER, JOHANN REINHOLD, a German traveler and naturalist, born at Dirschau, in Prussia, in 1729, died at Halle in 1798. In 1753, having studied for the clerical profession, he became pastor at Nassenhuben, near Dantzic. See FORSTER, JOHANN GEORG ADAM, in *Britannica*, Vol. IX, p. 418.

FORSTER, THOMAS IGNATIUS MARIA (1789-1850), an English meteorologist and physicist. In 1812 he entered the University of Cambridge, and in 1816 he edited an edition of Catullus. In 1817 he published *Observations on the Influence of Particular States of the Atmosphere on Human Health and Diseases*; in 1824, *The Perennial Calendar*, and in 1827 *The Pocket Encyclopedia of Natural Phenomena*.

FÖRSTER, WILHELM, a German astronomer, born at Grunberg, in Silesia, Dec. 16, 1832, and educated at Berlin and at Bonn. He was successively second and first assistant in the Berlin Observatory, in 1863 became professor extraordinary of astronomy in the University, and in 1865 succeeded Encke as director. He has published popular sketches of the history of astronomy and the lives of distinguished astronomers, and has edited the "Astronomisches Jahrbuch" since 1865.

FORSTER, WILLIAM, English philanthropist, born at Tottenham, near London, March 23, 1784, died Jan. 27, 1854. He was of Quaker descent, became a minister of the Society of Friends in 1803, and married Anna, sister of Thomas Fowell Buxton, in 1816. In 1820 he visited the United States; in 1838 settled as a preacher near Norwich, England; in 1843-44 engaged in missionary work in France; and in 1846 visited Ireland, endeavoring to relieve the suffering there caused by famine. In 1849 he was commissioned by the Yearly Meeting of London to present an address on slavery and the slave-trade to the rulers of Christian countries. In pursuit of this mission he visited most of the countries on the Continent of Europe, and in 1853 came again to the United States, and had interviews with the President and several Southern State governors. Before the completion of his work he died at Holston, Tenn.

FORSTER, WILLIAM EDWARD, an English statesman, son of William (1784-1854), was born at Bradpole, Dorsetshire, July 11, 1818, died April 6, 1886. He was educated at the Friends' School, Tottenham, and engaged in woolen manufacture at Bradford. In 1861 he was returned to the House of Commons for Bradford, and was a member of Parliament from that time until his death. He was under-secretary for the colonies 1865-66; became vice-president of the council on education, and a privy councillor in 1868; accepted from Mr. Gladstone a seat in the cabinet in 1870, and the same year introduced the greatest legislative measure associated with his name, the Elementary Education bill. In the Gladstone administration of 1880 he accepted the office of chief secretary for Ireland, which position he resigned in 1882. He visited the United States in 1874.

FORSYTH, a city and county-seat of Monroe county, Ga. It has a large cotton trade and contains Monroe Female College.

FORSYTHIA (named after William Forsyth (1737-1804), a British botanist), a genus of oleaceous shrubs, of which the two species, *F. viridissima* and *F. suspensa*, natives of China and Japan, are now very common in cultivation. They are conspicuous for the showy yellow flowers which they bear in early spring, before the leaves.

FORSYTH, JOHN (1780-1841), an American statesman. He was admitted to the Georgia bar in 1802, and became attorney-general in 1808. From 1813 to 1818 he served as a Democrat in Congress, and from 1818 to 1819 was a United States Senator, resigning to accept the appointment of minister to Spain. From 1823 to 1827 he was again in Congress, then became governor of Georgia, and in 1829 was once more elected United States Senator. He resigned in 1834 to become Secretary of State, and served till 1841.

FORSYTH, JOHN (1813-79), an American journalist, son of the preceding, was one of the foremost Democratic editors of the South. From 1856 to 1858 he was minister to Mexico, and in 1861, with Marshall J. Crawford, represented the Confederate States as commissioner to the National Government. After the civil war he was engaged in journalistic work in Mobile, Ala., until feeble health compelled him to retire.

FORT ADAMS, a fortification constructed between 1828 and 1838 by Gen. J. G. Totten, on Breton's Point, at the entrance to Newport harbor, R. I.

FORT-ADJUTANT, an officer holding, in a fortress, an appointment analogous to that of an adjutant in a regiment. He is responsible to the commandant for the internal discipline and the appropriation of the necessary duties to particular corps.

FORT AUGUSTUS, a village at the south end of Loch Ness, 29 miles southwest of Inverness. A fort intended to overawe the highlands was built here soon after the rebellion of 1715, on a small eminence on the loch.

FORT ATKINSON, a city of Jefferson county, Wis., on Rock River, near Lake Koshkonong. It has manufactories of wagons, and contains foundries and flouring mills. Pop. (1890), 4,482.

FORT BENTON, the county-seat of Choteau county, Mont., at the head of navigation on the Missouri River. Population (1890), 624.

FORT COLLINS, the county-seat of Larimer county, Col., on the Cache la Poudre River, 60 miles northwest of Denver. The town has good water-power, some manufactories, and contains Colorado Agricultural College. Pop. (1890), 2,011.

FORT HAMILTON, a village and fort on the east shore of the Narrows, New York harbor, in New Utrecht, Kings county, L. I. Pop. (1890), 2,617.

FORT DODGE, a city and county-seat of Webster county, Iowa, on the Des Moines River. It has quarries where gypsum, fire-clay and water-lime are obtained, and coal is mined in the vicinity. It contains various manufactories, and a Roman Catholic seminary. Population (1890), 4,871.

FORT DONELSON, a fortification in Stewart county, Tenn., on the left bank of the Cumberland River, 12 miles from Fort Henry. It was the field of action where the Union forces gained an important victory under Gen. Grant, Feb. 16, 1862.

FORTE: in music, the Italian term for loud; *fortissimo*, or *forte possibile*, as loud as possible.

FORT EDWARD, a railroad junction of Washington county, N. Y., on the Hudson River and Champlain Canal, 28 miles north of Troy. A dam 900 feet long crosses the River, affording excellent water-power. The village has a collegiate institution and extensive manufactories of iron, lumber, castings, stoneware and machinery. The ruins of an old fortification give the name to the village.

FORT FISHER, a fortification of Wilmington, N. C. During the civil war two assaults were made upon it—Dec. 24, 25, 1864, and Jan. 13-15, 1865. The fort fell into Union hands at the conclusion of the second assault.

FORT GEORGE, a fortification in the northeast of Inverness-shire, Scotland, on the line of the Caledonian Canal, on a point of land jutting into Moray Firth. It covers 15 acres, and has quarters for 3,000 men.

FORT GRATIOT, a village and military post of St. Clair, Mich., on the outlet of Lake Huron, and opposite Point Edward, Ontario.

FORTHCOMING: in the law of Scotland, an action by which an arrestment is made available to the arrester. The arrestment secures the goods or debt in the hands of the creditor or holder; by the forthcoming—the arrestee and common debtor are called before the judge to hear sentence given, ordering the debt to be paid, or the effects to be delivered up to the arresting creditor.

FORT HOWARD, a city of Brown county, Wis., near the mouth of the Fox River and opposite the city of Green Bay. It has an excellent harbor and a population (1890) of 4,754.

FORTIGUERRA, NICOLÒ, an Italian poet, born at Pistoja in 1674, died in 1735. Destined from youth for the church, he proceeded to Rome at an early period, where the power of the prelate Carlo Fabroni speedily secured him advancement, and he was raised to the dignity of prelate and papal chamberlain by Clement XI. His chief work, *Il Ricciardetto*, published two years after his death, was originally commenced, and one canto completed in a few hours, in confutation of friends who

maintained that the striking ease and fluency of Ariosto, Berni, and other poets were but apparent, and in reality the fruit of deep art and severe labor.

FORT KENT, a town of Aroostook county, Me. It has good water-power and manufactories of lumber. Population, 1,829.

FORT LEAVENWORTH, a village of Leavenworth county, Kan., on the Missouri River, and an important U. S. military post and depot of supplies for Western forts. This fort was established in 1827.

FORT MADISON, a city and county-seat of Lee county, Iowa, on the Mississippi River, opposite Niota, Ill. It has a State penitentiary, jail, schools, and manufactories of sashes, blinds, doors, machinery, castings, beer, furniture, plows, lumber and leather. Population (1890), 7,901.

FORT PLAIN, a village of Montgomery county, N. Y., on the Mohawk River and Erie Canal. It has manufactories of brooms, springs and axles, and contains a seminary. Population, 2,864.

FORT ROYAL, or **FORT DE FRANCE**, a fortified seaport of the French island of Martinique in the West Indies, and the capital of the colony. It stands on the west coast, in a bay of its own name, in latitude $14^{\circ} 35'$ north, and longitude $61^{\circ} 4'$ west. In 1839 it was almost totally destroyed by an earthquake. Population, 13,288.

FORT ST. DAVID, a town in India, on the Coromandel or east coast of Hindoostan. It is three miles to the north of Cuddalore, and 100 to the south of Madras.

FORT SCOTT, a city of Kansas, county-seat of Bourbon county, and one of the most important places in the southeastern part of the State. The city is built on a high plateau 800 feet above the level of the sea, on the south bank of the Marmaton River, near the Missouri border. It is in the midst of a region rich in bituminous coal, the mining and shipping of which give Fort Scott its chief commercial importance. There are also extensive flagstone quarries and cement rock deposits in the vicinity. Ten lines of railway furnish an outlet for the mineral products. In 1890 there were ten miles of street railway, operated by electricity. The city contains a large and handsome park, in the center of which is an artesian well. The United States Court-house and Postoffice building cost \$150,000. There is a high school and a normal college, the latter having in 1890 over 700 students, representing 12 different States. The principal manufactures are flour, woolen goods, soap, sorghum and beet sugar, carriages, etc. Population, in 1880, 6,750; in 1890, 11,837.

FORT SUMTER, the fortification at Charleston, S. C., first attacked by Confederate forces at the outbreak of the civil war, April 12, 1861. Maj. Anderson, commanding, was obliged to surrender, and the fort was held by the Southern army till Feb. 18, 1865. It is built on an artificial island, and the construction was begun in 1829.

FORT SMITH, a city of Arkansas, county-seat of Sebastian county, situated at the extreme western boundary of the State, on the south bank of the Arkansas River, about 170 miles from Little Rock. It is an important city, having a large trade in the Indian Territory. It is also the seat of the United States District Court for the western district of Arkansas, having criminal jurisdiction of the Indian Territory. In 1889 the county erected a court-house costing \$65,000. Other public buildings are the United States Custom-house, court-house, post office and jail. By an act of Congress a military reservation adjacent to the city limits was donated to the city for school purposes.

This gift is valued at \$750,000, nearly one-half of which has already been realized by the sale of lots.

The principal manufactories are saw mills, planing mills, iron foundries, machine shops, oil mills, etc. The machine shops of the St. Louis and San Francisco Railway company are located here. Population in 1880, 3,099; in 1891, 11,291.

FORTUNE, ROBERT, a Scottish botanist, born in Berwickshire, Sept. 16, 1813, died April 16, 1880. After serving an apprenticeship as a gardener he obtained employment in the Royal Botanic Garden at Edinburgh, and afterwards, in the gardens at Chiswick. In 1842 he was sent by the Horticultural Society of London to collect plants in Northern China. After his return he published *Three Years' Wanderings in Northern China* (1847). He subsequently visited China on three separate occasions, to study the methods of tea cultivation, to carry plants from that country to India, and to collect seeds and plants for the Government of the United States. *Yeddo and Peking* (1863) was written after his fifth and last journey to the East. His other books are: *A Journey to the Tea Countries of China* (1852); and *A Residence Among the Chinese* (1857). Fortune was for a few years director of the Botanical Gardens at Chelsea.

FORTUNY, MARIANO, Spanish painter, born at Reus, Catalonia, June 11, 1839, died in Rome Nov. 21, 1874. He studied in the Academy of Barcelona, and by the excellence of some early designs won a prize which enabled him to go to Rome in 1858. When Spain declared war against Morocco, Fortuny accompanied the expedition to Africa, and filled his portfolios with studies of Eastern life. On his return to Europe he renounced classical traditions, and, giving full scope to his originality and genius, put on canvas the essence of the materials he had gathered. With name and fame already established he went from Rome to Paris in 1866, and there his works were introduced to the whole art-loving world. In 1868 Fortuny went to Madrid and there married Mademoiselle Madrazo, a daughter of the director of the Royal Museum. In 1870 he took up his residence in Granada, and in 1872 returned to Rome, where he resided until his death. His best-known pictures are: *A Spanish Marriage*; *The Serpent Charmer*; *The Amateur of Prints*; *A Fantasia at Morocco*; *The Sword-Sharpener*; *The Academicians of Arcadia*. Besides his oil-painting he gave considerable attention to etching and to water-colors.

FORT WILLIAM, a village and fort of Scotland, in the county of Inverness, on Loch Eil, near the foot of Ben Nevis, adjacent to the village of Maryburgh. Population, 1,212.

FORT WAYNE, a city of Indiana, county-seat of Allen county (see Britannica, Vol. IX, p. 469). Fort Wayne is the third city in the State in population, and the second in manufacturing importance. An abundant supply of pure water is obtained from 30 wells, each 8 inches in diameter and 55 feet deep, the outflow being 30,000,000 gallons daily. In 1891 there were 13 public school buildings; also a grammar school, with a library of 7,000 volumes, an extensive laboratory, and elaborate scientific apparatus. The Roman Catholics have a large and flourishing academy. The State Asylum and School for feeble-minded youth is located at Fort Wayne, and has accommodations for 1,000 pupils. Eight railroad lines meeting here give the city unusual commercial advantages. Its leading manufactures are car-wheels, electrical apparatus, heavy machinery of all kinds, agricultural implements, leather, steam engines, furniture, etc. Population in 1880, 26,880; in 1890, 35,349.

FORT WORTH, a city of Texas, county-seat of Tarrant county, situated at the confluence of the West, Clear, and Trinity Rivers in the northern part of the State, about 175 miles north of Austin. Next to Dallas, it is the most important railroad center in northern Texas. It is surrounded by a rich agricultural region, producing cotton, grain, and fruits. The city has good water supply obtained from two sources, the Clear River and artesian wells, some 200 in number. In 1890 there were in operation 40 miles of electric street railways. A fine bathing establishment, the Natatorium, costing \$50,000, is one of the institutions of the city. The court-house and city hall are noteworthy structures, also the Chamber of Commerce building, which cost \$100,000. The High School building, completed in 1891, is a handsome and costly edifice. The Fort Worth University (Methodist) is located here, and the Roman Catholics maintain an academy. There are manufactories of flour, cotton and woolen goods, leather, etc., and rolling-mills, iron foundries, a jute factory, woven wire factory, stock yards, and pork-packing establishments. In 1872 there was but one house standing within the present city limits; in 1876 the population was 1,123; in 1880, 7,000; and in 1890, 20,725.

FORWARD, WALTER (1786-1852), an American statesman. For a time he was editor of the Pittsburgh "Tree of Liberty," a Democratic newspaper, but later studied law and was admitted to the bar in 1806. From 1822 to 1825 he served in Congress. In 1841 he was appointed first comptroller of the treasury, and the same year received the appointment to the treasury portfolio. From 1843 to 1849 he was engaged in his law practice, and 1849-51 was *chargé d'affaires* in Denmark. In 1851 he became president judge of the district court of Alleghany county, Pa.

FOSSA ET FURCA, or PIT AND GALLS, an ancient privilege granted by the crown to barons and others, which implied the right of drowning female felons in a ditch, and hanging male felons on a gallows.

FOSS, CYRUS DAVID, an American M. E. bishop, born in 1834. He graduated at Wesleyan University, Middletown, Conn., in 1854; for three years was an instructor in Amenia Seminary, N. Y., and in 1857 entered the traveling ministry in the New York conference. In 1857-59 he was stationed at Chester, N. Y.; in 1859-65 was in Brooklyn, and in 1865-75 in several churches in New York city. In 1875 he was chosen president of Wesleyan University, and served in that capacity until 1880, when he was elected and ordained a bishop. Wesleyan gave him the degree of D. D. in 1870, and Cornell College, Iowa, that of LL. D. in 1879. He was a member of the general conference in 1872, 1876 and 1880. Bishop Foss has contributed to current literature, and published several sermons and addresses.

FOSSA MARIANA, a system of canals, from the Rhone to near the Gulf of Stomalinne, cut by Marius, B. C. 102.

FOSSILIFEROUS ROCKS, those which contain organic remains. If we except the lowest metamorphic rocks, in which no fossils have been found, the term is equivalent to the "stratified rocks" when used comprehensively; but it may also be applied to a particular bed, as when we speak of an unfossiliferous sandstone compared with the fossiliferous shale or limestone.

FOSTER, BIRKET, an English artist, born at North Shields, Feb. 4, 1825. At an early age he showed remarkable talent for drawing, and as pupil to Landells, wood-engraver, from 1841 to

1846, he produced a large number of subjects for wood-engraving, the earliest for Mr. and Mrs. S. C. Hall's *Ireland* (1843), and many for the "Illustrated London News." He afterwards illustrated *Evangeline*, and many of the standard English poets. In 1859 Foster exhibited the first of many water-colors, *The Mill at Arundel*; in 1860 he was elected an associate, and in 1861 a member of the Water-color Society. He has devoted himself chiefly to depicting child-life and rural scenes.

FOSTER, CHARLES, a governor of Ohio, born in 1828. In 1870 he was chosen to Congress as a Republican, and was three times reelected. He was twice chosen governor of Ohio, and served from 1880 to 1884. Under the Harrison administration he served as Secretary of the Treasury.

FOSTER, JOHN GRAY (1823-74), an American soldier. He served in the Mexican war, and received the brevets of first-lieutenant and captain for gallantry. For a time he was employed on coast survey, and in 1855-57 was assistant professor of engineering at West Point. At the beginning of the civil war he safely removed the garrison of Fort Moultrie to Fort Sumter, and was brevetted major for these services. In October, 1861, he was made brigadier-general of volunteers, and the same year was brevetted lieutenant-colonel. In 1865 he was brevetted major-general for gallant services in the field during the Rebellion. After the war he served as superintending engineer of various river and harbor improvements. He contributed to periodical literature on engineering topics, and is the author of *Submarine Blasting in Boston Harbor*.

FOSTER, JOHN WATSON, an American diplomatist, born in 1836. In 1857 he began the practice of law in Evansville, Ind. At the beginning of the war he entered the national service as a major, and distinguished himself in many battles under Grant and Sherman. In 1869 he was appointed postmaster of Evansville, and in 1873 was sent to Mexico as United States minister, receiving a re-appointment in 1880. Later the same year he was transferred to Russia, and in 1881 resigned to attend to private business. From 1883 to 1885 he served as minister to Spain. In July, 1892, he was appointed Secretary of State, to succeed Mr. Blaine.

FOSTER, JOHN WELLS (1815-73), an American geologist. In 1835 he was admitted to the Ohio bar, but his leisure moments were spent in the study of science. From 1835 to 1844 he was employed as an assistant in the geological survey of Ohio, and in 1845 visited the Lake Superior region in the interest of several copper mining companies. In 1847 he was appointed on a geological survey of the Lake Superior region, and the results of his survey, published by Congress in 1852, still remain the authority. For a time after the completion of this work he lived in Massachusetts, where he was active in the formation of the Republican party. In 1858 he went to Chicago, and for a time was land commissioner for the Illinois Central Railroad. Mr. Foster was a member of several scientific societies, and held important offices in not a few.

FOSTER, LAFAYETTE SABINE (1806-80), an American statesman. He was admitted to the Connecticut bar in 1831; for a time edited the Norwich "Republican," and in 1839 and 1840 was elected to the legislature. In 1846-48 he was again in the legislature, and in 1851-52 was mayor of Norwich. In 1854 he again went to the assembly, and the same year was chosen to the United States Senate, and was reelected in 1860. In 1865 he was made president of the Senate *pro tempore*, and for a while, was acting Vice-President of the United States. In 1870 he once more served in the assembly, but re-

signed the same year to take his seat on the bench of the Supreme Court. He retired in 1876.

FOSTER, RANDOLPH SINKS, an American M. E. bishop, born in 1820. He received his education at Augusta College, Ky., and in 1837 entered the itinerant ministry of the M. E. church in the Kentucky conference. Later he was transferred to Ohio, and in 1860 to New York. Up to 1857 he had held pastorates in Hillsboro, Portsmouth, Lancaster, Springfield, Cincinnati, New York and Brooklyn. In 1856-58 he was president of the Northwestern University, Evanston, Ill. For some time afterward he was pastor in New York and Sing Sing, and in 1868 was delegate to the British Wesleyan conference. The same year he became professor of systematic theology in Drew Theological Seminary, Madison, N. J., and two years later was appointed president. In 1872 he became bishop of the M. E. church, and afterward made episcopal visitations in Norway, Sweden, Denmark, Germany, Switzerland, Italy, India and South America. He is the author of *Objections to Calvinism as It Is; Christian Purity; Ministry for the Times; Beyond the Grave; Centenary Thoughts for the Pulpit and Pew of Methodism; and Studies in Theology*.

FOSTORIA, a natural-gas center of Seneca county, Ohio, containing glass works, flouring-mills and other manufactories. The city has developed rapidly and had, in 1890, a population of 7,070.

FOULARD, a light fabric of flexible silk, without twill, used principally for ladies' dresses. It was originally imported from India, but is now made also in the south of France.

FOUNTAIN. In heraldry water is represented by a round ball having wavy stripes of blue and white barways, and called a fountain.

FOUQUIERA, a genus of Mexican trees or shrubs of the order *Tamariscinæ*, resinous and brittle, having leafless branches and stems, and bearing brilliant crimson flowers.

FOURCROYA, a genus of plants of the natural order *Amaryllidæ*, nearly allied to *Agave*, but with stamens shorter than the corolla. The species are all tropical. The leaves yield a fiber similar to the pita flax, obtained from the species of the *Agave*.

FOUR EVANGELISTS, part of a larger group of islands known as the *Twelve Apostles*, which lie off the west entrance of the Strait of Magellan. The eight other islands, with which they are classed as above, are about 15 miles farther out into the Pacific.

FOUR LAKES, a chain of deep lakes (Mendota, Monona, Waubesa, and Kegonsa) in Dane county, Wisconsin, connected by short outlets.

FOURNI ISLANDS, a group of about 20 small islands in the Grecian Archipelago, between Nicara and Samos on the western coast of Asiatic Turkey. The largest of these is about five miles in circuit.

FOURTH: in music, an interval including four degrees of the scale. The interval of the perfect fourth contains two whole tones and one semi-tone; a diminished fourth, one whole tone and two semi-tones; and the superfluous or augmented fourth, three whole tones. The perfect fourth is the second most perfect consonance after the octave, and the next to the fifth.

FOWEY, or Foy, a town of England, in the county of Cornwall, 25 miles southwest of Launceston. The principal exports are copper ore, pilchards, china clay, and stone. Population, 1,394.

FOWL. See *Britannica*, Vol. IX, p. 491.

FOWLER, CHARLES HENRY, an American M. E. bishop, born in 1837. He graduated at Genesee College, Lima, N. Y., in 1859, and in 1861 at Garrett Biblical Institute, Evanston, Ill. The same year

he was admitted into the Rock River conference, and was appointed to churches in Chicago till 1872, when he was chosen president of Northwestern University. In 1876 he was elected editor of the New York "Christian Advocate," and in 1880 became one of the corresponding secretaries of the Missionary Society of the M. E. church. In 1884 he was elected and ordained bishop. Northwestern University gave him the degree of D.D., and Syracuse University, N. Y., that of LL. D.

FOWLER, SIR JOHN, civil engineer, born at Sheffield in 1817, assisted in the construction of the London and Brighton and other railway lines, and was afterwards engineer of the Manchester, Sheffield and Lincolnshire group of railways, besides many other lines, including the original "underground" or Metropolitan Railway, London. River improvement and the construction of large docks have also occupied his attention, and he was made K.C.M.G. in 1885 for his services as consulting engineer in the public works in Egypt; but his greatest work is the Forth Bridge, designed by him and Mr. B. Baker.

FOWLER, THOMAS, English philosopher, was born at Burton-Stather, in Lincolnshire, 1st September, 1832. He graduated at Merton College, Oxford, in 1854, and has ever since been closely connected with that university, first as tutor of Lincoln College, afterwards as professor of Logic from 1873, and as president of Corpus Christi College from 1881.

FOXBORO, a village and township of Norfolk county, Mass., 21 miles southwest of Boston. It has large manufacturing industries. Straw hats, bonnets, carpet-linings, soap and spring beds are made in the township. There is a granite quarry here. Population, 2,933.

FOX, GUSTAVUS VASA (1821-83), a United States naval officer. He entered the navy in 1838 as midshipman, and served until 1856, when he resigned with the rank of lieutenant. He then accepted the position of agent of the Bay State woolen mills at Lawrence, Mass. At the beginning of the civil war he was appointed Assistant Secretary of the Navy, and his services in this position were extremely valuable. Soon after the war he was sent on a special mission to Russia to convey to the czar the congratulations of the United States Congress on his escape from assassination. Capt. Fox subsequently became manager of the Middlesex mills.

FOX INDIANS. See INDIANS, AMERICAN, in these Revisions and Additions.

FOX RIVER, the name of two streams rising in Wisconsin. (1) The Fox River, or Pishtaka (220 miles), flows south to Aurora, then southwest to the Illinois, which it enters at Ottawa. (2) The Fox River, or Neenah, after a tortuous but generally northeast course of about 250 miles, empties into Green Bay in Lake Michigan. Near its headwaters it approaches within $1\frac{1}{4}$ miles of the Wisconsin River, with which it is connected at Portage City, by a canal, and thus the Mississippi River and Lake Michigan are united.

FOXTAIL GRASS, a genus of grasses, distinguished by a spiked panicle, two glumes nearly equal, and generally united at the base, inclosing a single floret which has a single *palea* with an awn rising from a base. The species are chiefly natives of temperate countries.

FOYERS, a small river of Scotland, joins Loch Ness eight miles northeast of Fort Augustus. It is noted for its cascades; the lower fall, 90 feet high, is the finest cascade in Britain.

FRAME: in gardening, the covering of any kind of hotbed, flued pit, or cold pit, used for the culti-

vation of plants not sufficiently hardy for the open air. Frames are generally made of wood and glass, in one piece or in sashes, according to the size of the hotbed or pit.

FRAMINGHAM, in Middlesex county, Mass., comprises the villages of Centre and South Framingham and Saxonville. It has the oldest normal school in America. Among the articles manufactured here are carriages, woolen and straw goods, and shoes. Population (1890), 9,239.

FRANC, a French silver coin which forms the unit of the French monetary system. Introduced into France 6th May, 1799, it was extended to the other countries comprised in the Latin union—viz. Belgium, Italy, and Switzerland by the convention of 1865, and has since then been adopted by Roumania (1868), Spain (1871), Servia (1874), Bulgaria (1880), and Greece (1882). In Belgium and Switzerland the coin is known as the franc; in Italy, *lira*; in Greece, *drachma*; in Roumania, *lei*; in Servia, *dinar*; and in Spain, *peseta*. The franc is coined of silver, $\frac{833}{1000}$ fine, and weighs five grammes, its value being about $9\frac{1}{2}$ d. English money, or 19 cents of United States. One pound sterling = 25·2 francs. The franc is divided into 100 centimes, but the old division into 20 sous, valued at 5 centimes each, is still made use of in common life. There are in France silver coins of $\frac{1}{2}$, $\frac{1}{4}$, 1, 2 and 5 francs, and gold pieces of 5, 10, 20, 50 and 100 francs.

FRANCAVILLA, a town in the Italian province of Lecce, lies 22 miles west-southwest of Brindisi. It has tanning, cloth-weaving, and trade in wine and oil. Population (1881), 17,559.

FRANCE. For the geography, history, government and productions of France, from its earliest settlement to the close of the year 1879, see *Britannica*, Vol. IX, pp. 505-686. After the resignation of Marshal MacMahon and the election of M. Grévy to the presidency, the Republican party, under the leadership of the eloquent Gambetta, instituted various measures of doubtful expediency. The Communards were rehabilitated; the church was irritated by violent measures; the Tunis expedition was entered upon; and the peasant proprietors, the true conservative power in France, became distrustful of their chosen representatives. Gambetta's accession to the premiership was not calculated to allay the general distrust, and his death (1882), which left his party without a leader and the people without an idol, paved the way for internal discords, which seriously impaired Republican prospects. Owing to the vacillating policy of the ministry, French influence in Egypt was greatly weakened; and the Tonquin expedition and embroilments with China, which cost many lives and much treasure without perceptible returns, increased the general feeling of distrust. Accusations of jobbery and malversations brought against the son-in-law of M. Grévy led to the resignation of the latter, Dec. 2, 1887. In his message to the Senate and Chamber of Deputies he declared that they had practically summoned him to resign, and he yielded in order to avoid the possible consequences of a conflict between Parliament and the executive. M. Marie François Sadi-Carnot was elected President of the Republic and a new ministry formed, with M. Tirard as President of the Council.

The political situation became still further disturbed about this time by the efforts of Gen. Boulanger, who was supported in his schemes of personal political aggrandizement by the three reactionary parties—the Orleanists, the Imperialists and the Legitimists. Although Gen. Boulanger had performed no public service, and given no evi-

dence of any preëminent ability, he became a popular idol. He had said nothing and done nothing of significance, but he was supposed to entertain undying enmity to Germany, and this was enough to secure him a powerful following. Then, too, he was a convenient figure-head for a movement of discontent with the situation and a desire for a revision of the constitution; and the rational, practical, and undoubtedly liberal parliamentary institutions which the Third Republic had been instrumental in implanting in France seemed to be in serious jeopardy.

In the French Senatorial elections, Jan. 5, 1888, the Republicans lost three seats, and early in April a new ministry was formed with M. Floquet as President of the Council. Gen. Boulanger was elected to the Chamber of Deputies from the Department du Nord, April 15, by over 96,000 majority, and at once became the leader of the opposition to the government. After a stormy debate a motion by Gen. Boulanger for the dissolution of the Chamber was rejected by that body, July 12, and a vote of censure passed upon him, whereupon he resigned; but at the election in Paris, which took place Jan. 27, 1889, he was reelected by a majority of 54,432. On Feb. 14, Premier Floquet tendered the resignation of the cabinet, and a new cabinet, with M. Tirard as premier, was announced Feb. 21. By a resolution adopted April 4, the French Chamber decided to prosecute Gen. Boulanger for threatening the peace of the Republic. The trial began before the High Court of the Senate Aug. 8, and resulted in the conviction of the General, together with Count Dillon and Henri Rochefort, of conspiracy and attempt at treason. They were condemned to transportation and imprisonment in a fortified place; but Gen. Boulanger escaped to England. His connection with a plot for the restoration of the Orleanists was proved and in 1891 he committed suicide.

Within the four years following the downfall of Boulangerism France underwent numerous changes of ministries and her institutions suffered from many strains. The failure of the Panama Canal scheme led to the prosecution of Comte de Lesseps (q. v.) and his son; of Gustave Eiffel (q. v.), and of many politicians and ex-ministers, who were convicted of bribery and corruption in January, 1893, and sentenced to imprisonment and fine. The sentence against the elder De Lesseps was not carried into effect on account of his health. The foes of the Republic—Bonapartists, Orleanists and Clericals—took advantage of all these facts to operate against the government, but met with poor success.

The latest official statistics place the area of France at 204,092 sq. miles, and the population (April 12, 1891), at 38,343,192; density per square mile, 187. Notwithstanding a moderate death-rate the population of France increases more slowly than in most States of Western Europe, owing to the low rate of births. In 1889 there were 111 births for every 100 deaths, but in 32 departments, mostly in the south, the deaths were in excess of the births.

Public education in France is entirely under the supervision of the government. In 1890 there were only 59 communes which had no primary school, public or private. The public funds, communal, departmental and state, devoted to primary instruction in 1888, amounted to 150,000,000 francs. In 1889, 4,622,619 children of school age were enrolled in primary and infant schools. About 78,000 are taught in higher schools, and nearly 10,000 at home, while many children between 11 and 13 years of age discontinue attendance at school, having received certificates of primary instruction.

The number of untaught children is thus very small.

The budget estimates for the revenue for 1892 were 3,780,077,692 francs, and the estimated expenditures 3,779,499,084 francs. The total capital of the French national debt cannot be exactly determined, but the most usual estimate is 32,000,000,000 francs (about \$6,400,000,000).

The military forces of France are organized on the basis of laws voted by the National Assembly in 1872, supplemented by further organization laws, passed in 1873, 1875, 1882, 1887, and 1889. These laws enact universal liability to arms. Substitution and enlistment for money are forbidden, and it is ordered that every Frenchman not declared unfit for military service may be called up, from the age of twenty to that of forty-five years, to enter the active army or the reserves. By the law of 1882, supplemented by that of 1888, the yearly contingent must serve three years in the active army, 6 in the reserve, 6 in the territorial army, and 10 in the territorial reserve. The active army is composed of all the young men, not otherwise exempted, who have reached the age of 20, and the reserves of those who have passed through the active army. Neither the active army nor its reserves are in any way localized, but drawn from and distributed over the whole of France. On the other hand, the territorial army and its reserves are confined to fixed regions, determined from time to time by administrative enactments. According to the budget for 1891, the peace strength of the whole French army is composed of 573,277 men and 142,870 horses, an increase of 17,947 men and 4,569 horses over 1890. In addition to this the territorial army numbers 37,000 officers and 501,716 men. Taking into account the various classes of reserves, France has a war force of about two and one-half millions of men at her disposal; and, taking account of the various classes of able-bodied men whose services have been dispensed with, the total number amounts to 3,750,000.

Of the total area of France (52,857,199 hectares) 8,397,131 hectares are under forests, and 36,977,098 hectares under all kinds of crops, fallow, and grasses. The production of wine and cider in 1890 amounted to 27,416,000 hectolitres; and the value of the crop of chestnuts, walnuts, olives, and plums in 1889 was 109,516,741 francs. January 1, 1890, the number of farm animals in France were: Horses, 2,881,153; cattle, 13,508,252; sheep, 21,996,731; pigs, 6,037,743; goats, 1,505,470. Silk culture is carried on in 23 departments. In 1889 the production of cocoons was 7,409,830 kilogrammes; 951,830 kilogrammes of cocoons were exported, valued at 9,756,258 francs, and 71,428 kilogrammes of silkworm's eggs, valued at 5,714,240 francs. The mineral and metal products for 1889 were, in tons: Coal, 24,588,880; pig iron, 1,722,480; finished iron, 793,358; steel, 529,021.

The official figures for 1887 of the woolen, cotton, and silk industries, are as follows:

	Woolens.	Cottons.	Silks.
Works.....	.....	.....	1,256
Number of mills.....	1,987	895	1,016
Operatives.....	100,372	121,843	108,819
Horse-power.....	40,466	68,112	28,777
Spindles.....	3,151,871	5,039,263	1,109,466
Power looms.....	44,682	72,784	51,399
Hand looms.....	25,399	28,213	44,287

The value of imports and exports of cotton in millions of francs appears as follows:

Years.	Imports.		Exports.	
	Yarn.	Cloth.	Yarn.	Cloth.
1867-76	24.4	47.2	4.5	66.4
1877-86	35.0	67.9	2.4	33.3
1887	31.1	50.2	3.5	117.5
1888	25.8	41.0	2.7	106.3
1889	29.4	41.3	3.1	116.2

The values of the yearly imports and exports of woollens and silks in millions of francs are seen from the subjoined table:

Years.	Woolens.				Silks.	
	Imports.		Exports.		Imp'ts.	Exports.
	Yarn.	Cloth.	Yarn.	Cloth.	Yarn.	Cloth.
1867-76	18.8	67.6	32.7	286.1	30.9	429.6
1877-86	17.0	77.3	38.1	349.0	40.9	251.0
1887	12.4	63.9	39.6	350.4	53.3	209.8
1888	14.1	65.2	37.2	325.4	50.5	223.2
1889	12.9	67.8	55.5	364.4	58.1	260.8

In 1888-89 there were 380 sugar works (including two distilleries), employing altogether 54,376 operatives, and 43,561 horse-power. It is estimated that the total annual yield of all French industries amounts to 12,800,000,000 francs.

In 1889 the total imports amounted to 5,320,000,000 francs, and the exports to 4,803,000,000 francs. The principal articles of import were wine, raw wool, cereals, raw silk, raw cotton, timber and wood, hides and furs, oil seeds, coffee, coal and coke, fruits, cattle, sugar, woolen, silk and cotton textiles, and flax. The principal articles of export were woolen, cotton and silk textiles, wine, raw silk and yarn, raw wool and yarn, small ware, leather goods, linen and cloth, metal goods (tools), cheese and butter, spirits, sugar, skins and furs, and chemical produce.

The public roads comprised in 1888: National roads, 37,706 kilometres; departmental roads, 29,900 kilometres; local roads, 602,500 kilometres. French railroads have grown from 9,086 kilometres in 1860 to 33,189 kilometres in March, 1890, of which 2,628 kilometres belonged to the state. The total length of the telegraphic lines on Jan. 1, 1889, was 88,047 kilometres, with 276,527 kilometres of wires, and 237 kilometres of pneumatic tubes at Paris.

FRANCIS JOSEPH I, emperor of Austria and king of Hungary, was born August 18, 1830, and succeeded to the throne of Austria, Dec. 2, 1848, on the abdication of his uncle, Ferdinand I. In April, 1854, he married the Princess Elizabeth, daughter of Duke Maximilian-Joseph. Their son, the Crown Prince Rudolf, born in 1858, married in 1881 the Princess Stéphanie of Belgium, and committed suicide, January 30, 1889. The heir presumptive to the throne is the Archduke Charles Louis, born July 30, 1833, who is married to a daughter of Dom Miguel of Portugal. Francis Joseph, on ascending the throne, promised to govern as a constitutional monarch, but also immediately dissolved the national assembly and assumed absolute power. Rebellion in Hungary was put down with the help of Russia, and the Italian provinces were held by the iron hand of Radetsky. The Austrian emperor remained neutral during the Crimean war. In 1855 he signed a concordat

with the Pope, giving the clergy full power over education. In 1859 occurred the war with France and Italy, when Francis Joseph took the field in person. The decisive Austrian defeats at Magenta and Solferino led to the treaty of Villafranca, by which Austria lost Lombardy. In the spring of 1864 the Austrians and Prussians combined to rob Denmark of the Schleswig-Holstein duchies, and the quarrel over the spoils led in June, 1866, to war between Austria and the combined forces of Prussia and Italy. The Seven Days' war, which ended at Sadowa, broke the power of Austria. By the treaty of Prague Francis Joseph gave up to Italy all Venetia and the Fortresses of the Quadrilateral, and surrendered to Prussia the duchies and all claim to control in Germany. In 1865 the emperor adopted a policy of conciliation toward Hungary, and on June 8, 1867, he was crowned king of that country. A more liberal form of government was granted to the dual monarchy, a civil marriage bill was passed, and in July, 1870, the concordat was suspended. Since that time Francis Joseph has reigned as a constitutional monarch.

FRANKING PRIVILEGE, a right formerly enjoyed by government officers of sending letters and packages by mail free. The privilege belonged to members of the British Parliament from about 1660 till 1840, and, owing to the high rate of postage, was greatly abused. It was abolished on the establishment of penny postage. In America it was first granted by Congress, in 1776, to private soldiers actually in service, and was gradually extended to Senators, members of Congress, secretaries, bureau officers, postmasters, delegates, etc. The matter thus franked covered not only letters and newspapers, but also public documents, executive papers, and printed matter, the privilege being practically unlimited. Various partial reforms were from time to time attempted by legislation, and on Jan. 31, 1873, an act was passed entirely abolishing the franking privilege.

FRANKL, LUDWIG AUGUST, Baron, a German Jewish poet, born Feb. 3, 1810, at Chrást, in Bohemia, and educated at Prague and Leitomischl. He studied medicine at Vienna, but soon devoted himself to literature. In 1851 he was made professor of aesthetics in the Vienna Conservatory of Music. In 1856 he went to Jerusalem to found a school, and after his return was for some years in charge of an institute for the blind at Vienna. In 1877 the Emperor of Austria conferred on him the title of Baron of Hochwart.

FRANKLAND, EDWARD, D. C. L., LL. D., Ph. D., an English chemist, born near Lancaster, Jan. 18, 1825. He was appointed professor of chemistry in Owens College in 1851, Bartholomew's Hospital in 1857, the Royal Institution in 1863, the Royal College of Chemistry in 1865, and the Normal School of Science, South Kensington, in 1881. The latter position he resigned in 1885. He was elected a Fellow of the Royal Society in 1853, a corresponding member of the French Academy in 1866, and afterwards of other learned bodies. He has collected many of his papers in *Experimental Researches in Pure, Applied, and Physical Chemistry*, (1878), and published, in addition to manuals and lectures, works on lighting, sanitation, etc.

FRANKLIN, a city and county-seat of Johnson county, Ind., about 75 miles from Terre Haute. It has a college, expensive school buildings, saw mills, and flouring-mills. Population (1890), 3,781.

FRANKLIN, the county-seat of Simpson county, Ky., 51 miles north of Nashville. It has two colleges, a woolen factory, and flour mills. Pop., 2,324.

FRANKLIN, a railroad junction of Norfolk county, Mass., 28 miles southwest of Boston. It

contains Deane Academy, and establishments where woolen and straw goods are manufactured.

FRANKLIN, a village of Merrimack county, N. H., situated at the union of the Pemigewasset and Winnipisogee Rivers, the sources of the Merrimack. It has a paper mill, woolen mills, machine shops, and wood-working shops. Population, 4,085.

FRANKLIN, a city, railroad-center, and county-seat of Venango county, Pa., situated on Allegheny River at the mouth of French Creek. It has oil refineries, machine shops, carriage factories, and flour mills. Population (1890), 6,221.

FRANKLIN, the county-seat of Williamson county, Tenn., on Harpeth River, 18 miles south of Nashville. It contains a Masonic temple, Tennessee Female College, and Harpeth Male Academy, and among its business establishment are carriage manufactories, steam cotton-gins, a planing-mill, flour mills, and a furniture factory. Two battles of the civil war were fought here—April 10, 1863, and Nov. 30, 1864. Population (1890), 2,250.

FRANKLIN, WILLIAM BUEL, a United States soldier, born in 1823. He entered the army in 1843, and served in topographical engineers until the outbreak of the civil war, when he had attained the rank of captain. In 1861 he was appointed colonel of the 12th infantry, brigadier-general of volunteers the same year, and major-general in 1862. He then received the brevet of brigadier-general in the Regular Army, and in 1865 that of major-general. He resigned in 1866, and has since been engaged in various manufacturing enterprises. He was Connecticut State commissioner at the Centennial exposition of 1876, Presidential elector the same year, and adjutant-general of Connecticut in 1877 and 1878. In 1880-87 he was president of the board of managers of the National Home for disabled soldiers.

FRANKLINIA, a species of ternstroemiaceous shrubs or small trees, the *Gordonia pubescens*, formerly native to central and southeastern Georgia, but now known only in cultivation, is much prized as an ornamental evergreen, and for its beautiful, large white flowers.

FRANKLIN ISLAND, off the coast of Knox county, Maine, lies on the west side of the entrance of St. George's River. There is a brick light-house at its northern point. Lat. 43° 53' 31" N., long. 69° 22' 10" W.

FRANKLIN LAKE, in Elko county, Nevada, on the east side of the East Humboldt Mountains. It is nearly fresh, very shallow, and has no outlet. The tulé (*Scirpus validus*) grows abundantly in the lake.

FRANK-PLEDGE, a custom prevailing in England before the Norman Conquest, whereby the freemen of a neighborhood were responsible for the good conduct of each other. Ten men formed an association called a *tithing*, in which the ten men were answerable each for the others, so that if one committed an offense, the other nine were liable for his appearance to make reparation. Should the offender abscond, the members of the tithing, if unable to clear themselves from participation in the crime, were compelled to make good the penalty.

FRANZ, ROBERT, a German composer, born at Halle, June 28, 1815, studied under Schneider at Dessau, and in 1843 published a set of twelve songs, which won the warm praises of Schumann, Mendelssohn, Liszt, and other masters. He was organist of a church at Halle, and was very active in the department of church music. He was also professor in the conservatory of music and conducted large concerts. He has published over 250 songs for single voices, a Kyrie, and several chorales and

four-part songs, besides arrangements of the masterpieces of Bach and Handel. In 1877 he was obliged by deafness to give up his various positions, and to discontinue his musical work.

FRANZOS, KARL EMIL, a German author, of Jewish parentage, was born Oct. 25, 1848. He now resides in Berlin. His chief power as a writer is found in ethnographical description, especially in the form of romance. His works have been translated into almost every European language. The translation of *The Jews of Barnow* and *A Fight for the Right* have attracted special attention in England.

FRASER, ALEXANDER, R.S.A., was born in 1827, at Woodcockdale, near Linlithgow. Early showing a taste for art, he received his first instruction from his father, an able amateur. His first appearance in the Academy Exhibition was with a figure picture, *A Gipsy Girl in Prison*. But he soon abandoned the figure for landscape. He has made many sketches, and painted many pictures.

FRASER, ALEXANDER CAMPBELL, a Scottish metaphysician, born at Ardehatten, Argyllshire, Sept. 3, 1819, and educated at the Universities of Glasgow and Edinburgh. He became a Free Church minister, in 1856 succeeded Sir William Hamilton in the chair of logic and metaphysics at Edinburgh, and in 1859 became Dean of the Faculty of Arts. His edition of Berkeley's works, in four volumes, with dissertations and annotations, a life of the bishop, and an account of his philosophy, was issued by the Clarendon Press in 1871, *Selections from Berkeley* in 1874, and in 1881 his monograph on *Berkeley* was published in Blackwood's *Philosophical Classics*, to which series he also contributed *Locke* (1889).

FRASER, CHARLES (1782-1860), an American artist. In 1807 he began the practice of law in Charleston, S. C., and in 1818 retired, in order to devote himself exclusively to art. He paid particular attention to miniature painting, and in 1825 produced a portrait of Lafayette, and subsequently of a great number of citizens of South Carolina. He also painted numerous landscape and *genre* pictures, and in 1857 his works were exhibited in Charleston. He contributed to various periodicals, and published *Reminiscences of Charleston*.

FRASER, JAMES, an English bishop, born at Prestbury, near Cheltenham, in 1818, died Oct. 22, 1885. He graduated at Lincoln College, Oxford, in 1839, and in 1840 was elected to a fellowship at Oriel. Ordained in 1846, he held the living of Cholderton, Wiltshire, from 1847 to 1860, and that of Upton Nervet, near Reading, from 1860 to 1870. In 1870 he was consecrated bishop of Manchester. He published valuable reports on elementary education in England, on the educational systems of the United States and Canada, and on the employment of children. He also published a number of sermons, and two volumes appeared posthumously (1887).

FRATRES ARVALES, an association of twelve priests of ancient Rome, whose duties were connected with agriculture. The office was established at a very early date, and continued into the fourth century. One of the hymns chanted by them, contained in an inscription A. D. 218, and preserved in the sacristy of St. Peter's, is regarded as a specimen of the earliest Latin.

FRATTA-MAGGIORE, a town of Italy, six miles northwest of the city of Naples, has extensive rope-works, and furnishes great quantities of strawberries, also silk worms. Population, 10,800.

FRAUDULENT CONVEYANCE, a conveyance intended to defraud another who is not a party to such conveyance, or the intent of which is to avoid some debt, duty or obligation on the part of the party making it. Two famous English statutes

declare such conveyance void; a statute with substantially the same provisions has been enacted throughout the United States.

FRECHETTE, LOUIS HONORÉ, born in Quebec, Nov. 16, 1849; has long been connected with the press of Canada, and has published several volumes of poems. In 1884 he became chief editor of *La Patrie*, Montreal.

FREDERICK III., King of Prussia (Frederick I. of Germany), formerly known as "Unser Fritz," the Crown Prince of Prussia, was the son of Emperor William I., of Germany, and was born at Potsdam, Oct. 13, 1831. He was an interested witness of the scenes of the revolution of 1848, and it is more than probable that to the influence exerted by these scenes was due his liberal spirit in after years. In 1861 his father ascended the throne of Prussia as William I., and he was at that time a general in the army—having all through his life been the subject of thorough military training. He had previously married (in 1857) Princess Victoria Adelaide, the eldest daughter of Queen Victoria of England. The issue of this marriage was seven children, the eldest being the present Emperor William III., who was born in 1859. Frederick took part in the war of 1866 between Denmark and the coalition of Prussia and Austria, and also commanded one of the armies of invasion in the subsequent war between Austria and Prussia, and took a leading part in the decisive battle of Sadowa. During the Franco-Prussian war of 1870 he commanded the army corps which invaded France through the territories of Alsace and Lorraine, and for his distinguished services he was made field marshal-general, the highest military dignity known to the Prussian service. After the war was over he returned to Berlin and was engaged in civil duties, assisting his father in the administration of the affairs of the empire (of which he had become, by the crowning of his father as emperor, the prince imperial), and at this period of his life spent considerable time in foreign travel. He was not in sympathy with the extreme policy of Bismarck, but their amicable relations suffered no serious interruption. In his domestic relation he was plain, unostentatious; a good husband and a kind father; and although his entire life had been spent in the midst of soldiery and military surroundings, he was disinclined to war, and an ardent advocate of peace. He was universally beloved for his sterling qualities, and during his last illness was the object of more sympathy and tender solicitude than had ever before been the lot of any sovereign to receive. In March, 1888, on the death of his father, the Emperor William I., he ascended the imperial throne, and his brief reign of three months has a melancholy interest on account of his sufferings, borne with such heroic fortitude. He was never formally crowned, on account of his physical inability to undergo the fatigue incident to the ceremony, and he died at Berlin, June 15, 1888, surrounded by his family and the officials of his household.

FREDERICK, EMPRESS (Princess Royal of England), was born Nov. 21, 1840, wife of Emperor Frederick III. of Germany, and mother of the present emperor, William II.

FREDERICKSBURG, the county-seat of Gillespie county, Texas, 85 miles west of Austin. It has flour and saw mills, and a flourishing trade in corn and wheat. Population, 1,352.

FREDERICKSBURG, Va. Military outpost of Richmond. See *Britannica*, Vol. IX, p. 742.

FREDERICKTOWN, the county-seat of Madison county, Mo., 105 miles south of St. Louis. The famous Mine la Motte lead mines are in the vicinity. Population, 1,000.

FREDONIA, a flourishing village of Chautauqua county, N. Y., 3 miles from Lake Erie. It has a State normal school, an academy established in 1824, and a carriage manufactory. Grapes and garden-seeds are raised for sale, and the village for over forty years has been lighted by natural gas. Here was organized the first Patrons of Husbandry grange. Population (1890), 3,399.

FREDONIA, a city and county-seat of Wilson county, Kan., in the southeastern part of the State. Population (1890), 1,515.

FREEBURG, a village of Snyder county, Pa., contains a musical college, and the principal business of the vicinity is farming and ore-mining.

FREEDMEN'S BUREAU, THE, originated in the needs growing out of the abolition of slavery. To meet the grave questions raised by this state of things, the Freedmen's Bureau act was approved in 1865, giving the bureau the management of abandoned lands and of all matters relating to freedmen and refugees in any district under the jurisdiction of the army. These powers were afterwards enlarged to embrace "the care of all refugees and freedmen so far as to enable them to become practically self-supporting United States citizens." The Freedmen's Bureau was but a temporary expedient, closing with its temporary need.

FREEHOLD, the county-seat of Monmouth county, N. J., 24 miles east of Trenton. It has a machine shop, planing mill, iron foundry, and a fine monument erected in 1884 to commemorate the battle of Monmouth, 1778. Population, 2,932.

FREE-LANCES, roving companies of knights and men-at-arms, who, after the Crusades had ceased to give them employment, wandered from state to state, selling their services to any lord who was willing to purchase their aid in the perpetual feuds of the Middle Ages. They played their most prominent part in Italy, where they were known as *Condottieri*.

FREEMAN, EDWARD AUGUSTUS, D.C.L., LL.D., was born in Staffordshire, England, in 1823; was elected scholar of Trinity College, Oxford, in 1841, and fellow in 1845. He was afterward examiner in law and modern history, and in 1884 became regius professor of modern history. His great work is the *History of the Norman Conquest*, one of the leading historical productions of the century. Mr. Freeman was a member of many learned societies, and was decorated by half a dozen governments. He wrote extensively on architecture, history, and conquests of the Saracens, federal government, the Ottoman power in Europe, English and European history, and many other subjects. Mr. Freeman was the leader of what has been called the Teutonic school in English history, and he probably, carried away by his prepossessions, placed too great reliance on the evidence offered by the language and institutions, and overestimated the Teutonic element in the blood of the English people. He maintained a high ideal of the dignity of real history and the necessity for truth, and made unsparing onslaught on writers who made the true subordinate to the picturesque. He died in 1892.

FREEMAN, JAMES, clergyman, born in Charlestown, Mass., April 22, 1759; died Nov. 14, 1835. He was educated in the Episcopal Church, but adopted Unitarian tenets, and was the first American minister of that persuasion. Harvard made him D.D. in 1811.

FREEMAN, JAMES EDWARD, born in Nova Scotia in 1808; died in England in 1884. He became an associate of the National Academy of Design in New York in 1831, and an academician two years later. He painted principally portraits and *genre* pictures.

FREEMASONRY, an ancient and secret institution, at first composed of masons or builders, but now embracing among its members men of every rank and condition of life, of every nation and of every religion which acknowledges a Supreme Being and believes in the immortality of the soul. See *Britannica*, Vol. IX, pp. 747-52; also *SECRET AND BENEVOLENT SOCIETIES IN THE UNITED STATES*, in these Revisions and Additions.

FREE PORT, a port at whose wharves the vessels of all nations can load and unload free of customs duties and commercial charges, with the exception of the usual harbor dues. A free port is thus, from the commercial point of view, an open harbor in contradistinction to one that is closed to all vessels except those of the country in which it is situated, and from the administrative point of view financially a foreign territory within the state to which it politically belongs. In the Middle Ages free ports were established for the purpose of attracting trade to particular maritime centers, especially by Italy, France, Spain, Austria and Portugal, at the period when the exploitation of their colonies for the benefit of the mother-country was the ruling principle in the commercial policy of those states. In the end of the 18th and the beginning of the 19th century free ports acquired a position of peculiar importance during the years in which prohibitive and protectionist measures were in force. Since then, however, they have decreased both in importance and in number. At the present time their chief use is that of *entrepôts* for facilitating the more convenient interchange and distribution of commodities destined for more or less distant markets. To all intents and purposes their utility has been destroyed by the rival system of bonded warehousing, which has always prevailed in England and the United States in preference to the other system. In 1889 the only free ports remaining in Europe were Trieste and Fiume in Austria, and Hamburg and Bremen in Germany; but both Trieste and Fiume were on the point of being abolished as free ports, whilst in Hamburg and Bremen since 1888 only a restricted area has been maintained as a free port. Among free ports outside of Europe are Hong-kong, Menado in Celebes, Singapore, Georgetown (Penang), Amboyna, Banda, Ternate, St. Thomas (on the island of the same name in the West Indies), and Livingstone in Guatemala.

FREEPORT, a city of Illinois, county-seat of Stephenson county (see *Britannica*, Vol. IX, p. 752). Freeport has excellent railroad facilities, being at the western terminus of a division of the Chicago and Northwestern Railroad, and at the crossing of the Illinois Central and Western Union Railroads. Freeport College (Presbyterian), established here in 1872, is a flourishing institution. The city is largely engaged in trade and manufactures, and its growth, though not rapid, is substantial. Population in 1880, 8,515; in 1890, 10,159.

FREEPORT, a village of Queens county, L. I., N. Y., on the South Side Railway, and 24 miles from Brooklyn. Oyster planting and fishing are the chief industries. Population, 1,300.

FREE-SOIL PARTY. See *POLITICAL PARTIES*, in these Revisions and Additions.

FREESTONE, any rock which admits of being freely cut and dressed by the builder. It has also been defined as any rock which works equally freely in every direction, having no tendency to split in one direction more than in another. In this sense limestone and even granite have been called freestone.

FREE TRADE, a term which means, in a literal sense, trade or commercial intercourse free from

all artificial interferences or restrictions. The phrase also denotes one of the most important and fundamental doctrines in political economy, its adherents maintaining that the prosperity of a state or nation will be best promoted by permitting a free exchange of all commodities between its own people and those of foreign countries to the greatest possible extent. During the last few years the literature on the subject of free trade has become so abundant and widespread in the United States that an elaborate article on this subject is unnecessary. See *Britannica*, Vol. IX, pp. 752-62.

FREEZING, the congelation of liquid substances through abstraction of heat. The freezing point of water under ordinary circumstances is 32° Fahr., or 0° Cent. The freezing point is lowered, however, by an increase of pressure. This is the case with all substances which expand in freezing, but on the other hand the freezing point of substances which contract on solidifying is raised by pressure.

FREEZING, ARTIFICIAL. For many years prior to the beginning of the 19th century artificial freezing was merely an interesting experiment performed in laboratories. Subsequently, however, attempts were made to manufacture ice for economic purposes, and four methods advanced with varied success: (1) by freezing mixtures; (2) by the absorption of caloric into vapor, that of water being the best suited for the purpose; (3) the re-expansion of compressed air, which extinguishes caloric in the gas; and (4) by radiation into cosmical spaces. The machines used for making ice are inventions by which a commixture or solution of the substances to be employed is made to flow along a metallic surface containing the substances to be cooled, non-conductors of heat being employed to protect them from radiation and external heat.

FREEZING MIXTURE, a mixture that has the property of a rapid absorption of heat. It is generally composed of a solid mingled with one or more liquids, in which the solid dissolves, and in so doing causes a considerable absorption of heat.

FRELINGHUYSEN, FREDERICK, an American statesman, grandson of a Dutch pastor who emigrated to New Jersey in 1720, was born in 1753, graduated at Princeton, and was admitted to the bar in 1774. He raised a corps of artillery, and took part in the battles of Trenton and Monmouth Court-house; and he was a member of the Continental Congress in 1778 and 1782-83, and a United States Senator in 1793-96. In 1794 he was made a major-general of militia. He died in 1804.

FRELINGHUYSEN, THEODORE, born in New Jersey, March 28, 1787; died April 12, 1861. He studied law, and practiced in New Jersey, and from 1817 to 1829 was attorney-general of that State. In 1829 he was chosen United States Senator, and served until 1835. Afterward he was mayor of Newark, and in 1839 became Chancellor of the University of New York. In May, 1834, he was nominated for vice-president by the Whigs, Henry Clay heading the ticket. In 1850 Mr. Frelinghuysen became president of Rutgers' College, which position he held until his death.

FRELINGHUYSEN, FREDERICK THEODORE, born in New Jersey, August 4, 1817; died May 20, 1885. He practiced law and held minor offices in New Jersey, and in 1861 became attorney-general of that State. From December, 1866, to March 4, 1869, he served as United States senator. In 1870 he was nominated and confirmed as minister to England, but declined the appointment. In July, 1871, he was again elected to the United States Senate, and served until 1877. He was a strong Republican; voted for the conviction of Andrew Johnson, supported the civil rights bill, and was an ardent pro-

tectionist. He was a member of the Hayes-Tilden electoral commission. On December 12, 1881, he became secretary of state in President Arthur's cabinet, and held office until March 4, 1885.

FREMONT, JOHN CHARLES, born in Savannah, Ga., January 21, 1813. He was of French descent. In 1830 he was graduated at Charleston College, and in 1833 received the appointment of teacher of mathematics on the sloop of war *Natchez*; two years later he was made professor of mathematics in the United States navy. In 1839 he was commissioned lieutenant in the corps of topographical engineers, and in 1842 conducted a geographical survey of the then almost unknown region between the Missouri River and the Pacific Ocean. In May, 1843, he set out on a still longer expedition from the Rocky Mountains to the Pacific Coast. On his return, in 1844, he was brevetted captain, and in the spring of 1845 was sent to explore the great Western basin, and the maritime region along the Pacific, an expedition that resulted in the acquisition of California to the United States. These achievements brought him general notoriety, and he became popularly known as the "Pathfinder." During his absence from the Pacific Coast war was declared between the United States and Mexico, and General Kearney was sent to take possession from California. Frémont refused to obey some orders of the general, who was his military superior, was placed under arrest, and ordered to report at Washington. He was tried by court-martial, found guilty, and ordered to be dismissed from the service. President Polk sustained a part of the sentence, but remitted the penalty, and Frémont resigned his commission. In October, 1848, he fitted out, at his own expense, a large expedition, with the object of finding a practicable route over the mountains to California. After many hardships, he and his party reached Sacramento in the spring of 1849. Here he bought a large estate containing rich gold mines. In 1850-51 he was United States senator from California. In 1853 he led a fifth expedition along the line of the fourth, and in 1855 he settled in New York city. In 1856 he was the first candidate of the Republican party for President of the United States, and was defeated. When the civil war began Frémont was made major-general, in command of the Western department, his headquarters being at St. Louis. Here, without authority, he issued a proclamation freeing the slaves in his district, which was not confirmed by the government. Frémont was recalled from the West thereafter and placed in command in Western Virginia; here he was outgeneraled by the Confederate commander "Stonewall" Jackson. When General Pope was placed in command of all the forces in Western Virginia, Frémont resigned his commission and took no further active part in the war. In 1864 the Cleveland convention nominated him for the presidency, but he withdrew his name. Subsequently he devoted himself mainly to the promotion of a southern railroad across the continent, and spent much time in Europe for this purpose. In connection with this enterprise he was charged with irregularities in France, was tried while absent, found guilty, and sentenced to fine and imprisonment; but as he was absent the penalty could not be enforced. From 1873 to 1881 Frémont was governor of Arizona Territory; later he practiced law in New York city. On October 19, 1841, Frémont was secretly married to Jessie, daughter of Senator Thomas H. Benton, of Missouri. In May, 1890, Congress placed him on the retired list of the army, with the rank of major-general, and on July 13, 1890, he died. His publications include a *Report of the Exploring Expedition to the Rocky Mountains in 1842*, and to Oregon and North

California in 1848-4 (Washington, 1848; New York, 1846; London, 1849); *Col. J. C. Frémont's Explorations*, an account of all five of his expeditions (2 vols., Philadelphia, 1859); and *Memoirs of My Life* (Chicago, 1886).

FREMONT, a village of Newaygo county, Mich., contains a tannery, lumber and stave mills, and a chair factory. South of this village is Fremont Lake, a pleasant summer resort. Pop. (1890), 1,097.

FREMONT, a city and county-seat of Dodge county, Neb., and a great market for cattle, horses, hogs, and sheep. It has a normal and a business college, water works, gas and electric lights, telephone system, pork-packing houses, planing-mills and flouring-mills. Population (1890), 6,747.

FREMONT, a village of Wayne county, N. C. It has lumber mills, a wool-carding establishment, cotton-gins, and a good trade in lumber, cotton, and naval stores. There is a mineral spring in the vicinity.

FREMONT, capital of Sandusky county, Ohio, is situated on the Sandusky River, at the head of navigation, thirty miles east of Toledo by rail. Steamers ply between the city and the principal ports of Lake Erie, and it has manufactories of woollens, sashes and blinds, flour mills, and engineering works. Population in 1890, 12,500.

FRENCH BROAD RIVER rises in the western part of North Carolina, near the Blue Ridge, flows northward into Tennessee, thence northwest; then southwest, joining the Holston River about three miles above the city of Knoxville. It is about 200 miles in length, and is navigable by steamers for a distance of 30 miles.

FRENCH INDIA. The French possessions in India, as established by the treaties of 1814 and 1815, consist of five separate towns, which cover an aggregate of 50,803 hectares (about 200 square miles), and had on Jan. 1, 1889, the following estimated populations:

Pondichery.....	41,253
Karikal.....	34,719
Oulgaret.....	46,529
Villénour.....	35,983
Nedoukadou.....	33,487
Shandernagar.....	35,395
Bahour.....	27,129
La Grande Aldée.....	23,350
Mahé.....	8,249
Yabaou.....	4,199
Total.....	280,303

Of this total over 270,000 are Indians. The colonies are divided into five *dépendances* and ten communes, having municipal institutions. The governor of the colony resides at Pondichery. The colony is represented by one Senator and one Deputy. Estimated budget (1890), 1,989,483 francs; expenditure of France (budget 1892), 307,218 francs; debt, 300,000 francs. The chief exports from Pondichery are oil seeds. The imports in 1889 amounted to 6,844,099 francs, and total exports 25,996,708 francs.

FRENCH INDO-CHINA. Under this designation the French dependencies of Cochin-China, Tonquin, Annam, and Cambodia have, to a certain extent, been incorporated. There is a Superior Council of Indo-China, which fixes the budget of Cochin-China, and advises as to the budgets of Annam, Tonquin, and Cambodia. In 1887 the French possessions in Indo-China, including Annam and Cambodia, were united into a customs-union. In 1890 the external trade of the union reached 60,248,460 francs for imports and 56,995,119 francs for exports.

FRENCH LICK, a township of Orange county, Ind. Twelve saline sulphur springs are situated in a pleasant valley of this township, and the waters are useful for the cure of some diseases.

FRENCHMAN'S BAY, an arm of the ocean extending 30 miles into Hancock county, Me., with a width of about 10 miles. Mount Desert Island lies between the bay and the Atlantic.

FRENCHTOWN, a manufacturing town of Hunterdon county, N. J., on the Delaware River. Among the articles made here are iron and brass castings, regalia, sashes and blinds, distilled liquors, and carriages. Population, 1,023.

FRENEAU, PHILIP (1752-1832), an American poet. He contributed to the "United States Magazine" and the "Freeman's Journal," and in 1790 became editor of the New York "Daily Advertiser." Later he was appointed translator for the State department, and at the same time assumed the editorship of the "National Gazette." He next became editor of the "Jersey Chronicle," and in 1797 of the New York "Time-piece and Literary Companion," but his connection with this paper was brief. Freneau published *A Poem on the Rising Glory of America* (1771); *Voyage to Boston* (1774); *General Gage's Confession* (1775); *The British Prison-ship* (1781); *The Poems of Philip Freneau, Written Chiefly During the Late War* (1786); *A Journey from Philadelphia to New York, by Robert Slender, Stocking-weaver* (1787); *The Miscellaneous Works of Mr. Philip Freneau* (1788); *The Village Merchant* (1794); *Poems Written Between the Years 1768 and 1794* (1795); *Letters on Various Interesting and Important Subjects, by Robert Slender* (1799); *Poems Written and Published During the American Revolutionary War* (1809); *A Collection of Poems on American Affairs* (1815); and a translation of Abbé Robin's *Voyages and Travels* (1783).

FREPEL, CHARLES EMILE, born in France, June 1, 1827, entered the priesthood and in 1870 became bishop of Angers. He was returned to the chamber of deputies as a legitimist in 1881 and reelected in 1885. He has written a criticism on Renan's *Vie de Jesus*, and many histories of the saints and fathers of the church.

FRERE, CHARLES THEODORE, a French painter, born at Paris, June 24, 1815, died in 1888. He studied art with Coignet and Roqueplan, and made his first public appearance at the exhibition of 1834. In 1836 he went to Algeria, was present at the taking of the city of Constantine by the French in October, 1837, and afterwards visited the East. His pictures are chiefly representations of Eastern scenes. Among the more famous of these are the *Hall of the Arabs*, which was bought by the French government in 1850; *A Harem at Cairo*; *Ruins of Karnak*; *The Island of Phile*; *The Caravan of Mecca*; *The Nile—Evening*, and *The Desert—Noon*.

FRERE, SIR HENRY BARTLE EDWARD, K. C. B., G. C. S. I., D. C. L., an English colonial officer, born in Wales, March 29, 1815, died in London, May 29, 1884. He was educated at Bath and at Haileybury College, and entered the Indian Civil Service in 1833. In 1847 he became British Resident at Sattara, and three years later chief commissioner of Sind. During the mutiny in 1857 he succeeded in keeping his own province in subjection and assisted his colleagues in adjoining provinces. In 1862 he was appointed governor of Bombay, which post he held until his return to England in 1867. In 1872 he was employed on a successful mission to Zanzibar for the suppression of the slave-trade, and in 1877 was appointed governor of the Cape, and high commissioner for the settlement of affairs in South Africa. There being considerable difference of opinion among English statesmen with regard to the justifiableness of Sir Bartle's course in the Zulu war, he was recalled by the government in 1880. He subsequently devoted himself to the duties entailed upon him by the presidency of various learned societies, and to the

promotion of missionary work. He published several works on Indian and African subjects.

FRÈRE-ORBAN, HUBERT JOSEPH WALTHER, a Belgian statesman, born at Liège, April 24, 1812, was called to the bar of his native city, and acquired a high reputation among the Liberal party. It returned him to the Belgian Chamber as its representative in 1847. He was minister of public works and then minister of finance in that year; and began the reform of the corn laws in Belgium, before Sir Robert Peel reformed the corn laws in England. M. Frère-Orban has been a cabinet minister (with but short intervals) for nearly half a century; he was the founder of the Banque Nationale, and of the Caisse d'Épargne, and, during his various administrations, much has been done to advance the country; octrois have been abolished; education has been extended; the salt tax repealed; the great camp on the Escaut, which ensures a free landing to Belgium's ally, has been established; and many laws passed for the regulation of labor, and for promoting the welfare both of capitalists and of workmen. The emperor of Austria conferred on him, in May, 1881, the Grand Cross of the Order of St. Stephen.

FRÈRE, PIERRE EDOUARD, a French painter, born in Paris, Jan. 10, 1819, died at Ecouen, May 23, 1886. He studied under Delaroche, and first exhibited in the Salon of 1843. Most of his pictures represent the amusements and occupations of country children, and they are characterized by much grace and purity of feeling. His best known works are: *The Little Gourmand; Boys Going from School; Girls Going from School; The Road to School; The Orphan's First Prayer; and Preparing for Church.* The last is in the Corcoran Gallery at Washington.

FRESHWATER STRATA are so named from their supposed origin. This can be easily determined from an examination of the contained fossils. Though the great proportion of aqueous rocks are of marine origin, yet freshwater strata are occasionally met with. The Yellow Sandstones of the Old Red or Lower Carboniferous period are freshwater beds.

FRESNILLO, a mining town of the Mexican state Zacatecas, lies 7,200 feet above sea-level, at the foot of the argentiferous Cerro de Proaño, and has amalgamation works, etc. Pop., 15,000.

FRESNO, an enterprising city of California, county-seat of Fresno county, about 20 miles east of San Joaquin River and 40 miles north of Tulare Lake. Pop. (1890), 10,818.

FRETTY. When six, eight or more pieces are represented crossing and interlacing like lattice-work, the shield is said to be fretty.

FREUND, WILHELM, German philologist, born of Jewish parents, Jan. 27, 1806, at Kempen in Posen. Having studied at Berlin and Breslau (1824-28), he taught at Breslau, Hirschberg (1848-51), and Gleiwitz (1855-70), and finally settled down at Breslau to a life of literary activity. His principal work is a *Wörterbuch der lateinischen Sprache* (4 vols. Leip. 1834-45), on which the best known English-Latin dictionaries are based. Besides this he has written a number of school books, especially on the Greek and Roman classics, and some on philology.

FREYCINET, CHARLES LOUIS DE SAULCES DE, a French statesman, born at Foix, Nov. 14, 1823, and educated at the École Polytechnique in Paris. Appointed in 1864 an ordinary engineer of the first class, he was until 1870 a member of the council of Tarn-et-Garonne. In October, 1870, Gambetta appointed him his subordinate in the war department. Elected to the senate in 1876, he became minister of public works in 1877, and premier in 1879, with the portfolio of foreign affairs. He resigned in 1880,

but formed a ministry again in 1882 and in 1886; and in 1889 he became minister of war under M. Tirard. In 1890 he became for the fourth time premier and minister of war. On February 19, 1892, the Freycinet ministry resigned. This ministry is noted as the longest in power since the formation of the present republic. Its government was wise and strong. It crushed the Boulangist conspiracy, held in check anarchy and socialism, and won a respect for republicanism before unknown in France. Under Freycinet the French army grew, until to-day it is the most complete organization for war ever known. M. Freycinet has published several works on engineering, sanitation, etc., of acknowledged excellence. In 1878 he was elected a member of the Academy of Sciences, and in 1891 of the French Academy.

FREYJA, in Scandinavian mythology, the goddess of love, who dispenses all joys, delights and pleasures. She was wont to drive out in a chariot drawn by two cats. She claimed one-half of those slain in battle. She wept golden tears for her husband, who had traveled into distant countries. This goddess was particularly worshipped in Sweden. Freyja gave her name as the general designation for all women of rank and wealth in medieval times (*fromva*=*frau*).

FREYR, or FREY: in Norse mythology, the god of peace and fertility, who presided over rain, sunshine and all the fruits of the earth, and to whom prayers were addressed for a good harvest. He was the son of Njord, and was held in great veneration, especially in Sweden and Iceland. His chief temple was at Upsala.

FREYSTÄDTL, or FREYSTADT, a town of Hungary, 15 miles northwest of Neutra, on the Waga, opposite Leopoldstadt. Various articles of wood are extensively manufactured, and there are important cattle markets. Population, 6,346.

FREYTAG, GUSTAV, a German writer, born July 13, 1816, at Kreuzburg in Silesia; studied at Breslau and Berlin, and from 1839 till 1847 was a lecturer on German language and literature in the former university. In 1848 he settled at Leipsic, where he edited the "Grenzboten" until 1870. Since 1879 he has resided at Wiesbaden. His dramas, *Die Valentine* (1847), *Graf Waldemar* (1850), and *Die Journalisten* (1853), proved brilliant successes; but his greatest achievement in literature is undoubtedly *Soll und Haben* (1855, 30th ed., 1885), a realistic novel of German commercial life, which was translated into English under the title of *Debit and Credit* (1858). Other of his works are *Die Verlorne Handschrift* (1864, Eng., *The Lost Manuscript*, 1865), and the series (1872-81), called *Die Ahnen* (*Our Ancestors*), a series of stories illustrating German history from the earliest times; *Die Technik des Dramas*, the *Life of Karl Mathy*, *Doctor Luther*, 1883. Some of these works have been translated into English by Mrs. Malcolm.

FRIDESWIDE, St., daughter of Dida, an ealdorman, was the patroness of Oxford, where she was born early in the eighth century. She preferred a religious life to marriage with Algar, a great Mercian noble, who, coming in search of her, was struck blind. She was canonized in 1481. Catherine, Peter Martyr's wife, was buried beside her pillaged shrine in 1552; exhumed by Cardinal Pole, but re-interred there in 1561, when the remains of the virgin saint and of the ex-nun were indissolubly mingled together.

FRIEDRICH, KARL NIKOLAS, Imperial Prince of Germany, eldest son of Prince Karl (1801-85), second brother of Emperor Friedrich Wilhelm, born March 20, 1828, died June 15, 1885. He received a military education, entered the army in

his youth, was engaged in the Schleswig-Holstein war in 1864, and in the war against Austria in 1866 had command of the First Army. In the Franco-German war he commanded the Second German Army, defeated the French general Froissart at Speichorn, commanded in the siege operations against Metz, and after the surrender was made field-marshal. He afterwards recaptured Orleans, took Le Mans, and dispersed the Army of the Loire.

FRIEDRICH, JOHANN, a Roman Catholic theologian, born in Franconia in 1836. He was a leader with Dollinger in the Old Catholic movement. He became a professor of theology at Munich in 1865; assisted at the Vatican council in 1870, and subsequently, in life and labors, has been identified with the Old Catholics.

FRIEDRICHRODA, a town of Thüringen and a popular and favorite summer resort in the beautiful Schilfwasser valley, 13 miles southwest of Gotha by rail. The duke of Gotha's handsome country-seat, Reinhardtsbrunn, is situated here on the site of the old abbey of that name, which was destroyed in the Peasant war. The town has bleaching establishments and large laundries, supplied from Magdeburg, Berlin and Hamburg. Population, 3,146.

FRIEDRICHSDORF, a town in the Prussian province of Hesse-Nassau, on the southern slope of the Taunus, three miles northeast of Homburg. It was founded in 1687 by thirty-two Huguenot families, and its inhabitants still speak French.

FRIENDSHIP, a village of Allegheny county, N. Y. It is the seat of Baxter's Musical University, and has an academy and a furnace. Pop., 1,369.

FRIEZE, HENRY S., LL.D., born in Boston, Sept. 15, 1817; died in Detroit, Mich., Dec. 7, 1889. Graduated from Brown University in 1841, he became professor of the Latin language and literature in the University of Michigan in 1854, which position he held at the time of his death. He also twice acted as temporary president. Dr. Frieze collected in Europe the casts and the engravings that formed the nucleus of the present museum of art, and in many other ways was instrumental in the development of the university.

FRIGGA: in Northern mythology, a goddess who seems to have occupied an analogous position to that of Venus in Roman mythology. She was the wife of Odin, and was also the goddess of the earth and of marriage, being frequently confounded, and latterly quite identified, with Freyja. She was the only Scandinavian deity placed among the stars. From her Friday takes its name.

FRINGE TREE, a genus of plants of the natural order *Oleaceæ*, consisting of small trees or large shrubs, natives of America, the West Indies, and New Holland. The popular fringe tree or snow-flower found in the United States sometimes attains the height of 30 and 40 feet, has opposite, oval leaves 6 or 7 inches long, and numerous snow-white flowers in panicle racemes. The limb of the corolla is divided into four long linear segments; the fruit is an oval drupe. The tree is frequently cultivated as an ornamental plant.

FRISCHESHAFF ("Fresh-water Bay"), a lagoon on the coast of Prussia, southeast of the Gulf of Danzig, about 50 miles in length, 4 to 11 miles broad, and 332 sq. m. in area. It was once entirely walled off from the Baltic by a narrow spit of land, through which a passage, 1,247 feet wide and 14½ feet deep, was cut in 1510 during a violent storm. The Haff is 10 to 16 feet deep.

FRITH, WILLIAM POWELL, an English artist, was born in 1819 at Studley, near Ripon. At the age of 20 he exhibited his first picture at the British Institution, a portrait of one of the children of his

preceptor. In 1845 he became A.R.A., and in 1852 was made an academician. His two great pictures, *The Derby Day* and *The Railway Station*, have been engraved many times, and some of his productions, such as *Coming of Age*, *English Merry-making*, *The Village Pastor*, and *Life at the Seaside*, are almost equally well-known. In 1866 he exhibited *Before Dinner at Boswell's Lodgings in Bond Street*, which work was sold in 1875 for £4,567, up to that date the highest price ever given at auction for any picture during the artist's lifetime. Since that time Mr. Frith has constantly exhibited both illustrations of literature and pictures after the manner of his old successes. Of these *The Private View of the Royal Academy* (1881) has been the most ambitious. His Hogarthian series, *The Road to Ruin* (1878), is also well known. Mr. Frith published his *Autobiography* in 1887, and *Further Reminiscences* in 1888. He is a member of the Academies of Vienna, Belgium and Sweden. By his own desire, he was placed on the list of retired Royal Academicians, in 1890.

FROBISHER BAY, an inlet opening westward near the mouth of Davis Strait into the territory called by Frobisher *Mela Incognita*, at the southern end of Baffin Land. It is about two hundred miles long by above twenty wide, with rugged mountainous shores. It was, till Hall's voyage, called Frobisher Strait, being erroneously regarded as a passage into Hudson Bay.

FREBEL, JULIUS, nephew of Friedrich Froebel, the founder of the Kindergarten system, was born at Griesheim, Germany, July 16, 1806, and studied in the Universities of Munich, Jena and Berlin. He was professor of mineralogy at Zurich from 1833 to 1844; afterwards edited a radical political paper; removed to Prussia, but was obliged to leave for political reasons; took part in the revolution of 1848, and was elected to the German Congress at Frankfurt; was arrested and condemned to death for an attempt to excite a revolution in Vienna, but was pardoned. He subsequently traveled for several years in Central America, Mexico and California, returning to Germany as a naturalized American citizen. In 1862 he was an editor in Vienna, in 1867 founded a journal in Munich, in 1873 was made consul of the German empire at Smyrna, and in 1876 was transferred to Algiers in the same capacity. Among his publications are *Seven Years' Travel in Central America and the Far West* (1859); *Theorie der Politik* (1861-64); *Die Gesichtspunkte und Aufgaben der Politik* (1878); and *Die Realistische Weltansicht und die utilitarische Civilisation* (1881).

FROGMORE, an English royal palace and mausoleum in the park of Windsor, Berkshire. The palace, purchased by Queen Charlotte in 1800, has been one of the dwelling houses of the Prince of Wales since 1861. The mausoleum, a Romanesque edifice, cruciform in shape and surmounted by an octagonal dome, is consecrated to the memory of the Prince Consort, whose remains were transferred to it on Dec. 18, 1862.

FROHSDORF, a village in Lower Austria, 30 miles south of Vienna, on the river Leitha, and near the frontiers of Hungary. It is celebrated for its splendid castle, which acquired a kind of political importance through its having been from 1844 to 1883 the rendezvous of the elder Bourbon party and the residence of the Comte de Chambord.

FROND, a term used in botany to designate the leaves of cryptogamous plants.

FRONTENAC, LOUIS DE BUADE, COMTE DE, was born in 1620 and died in Quebec, November 28, 1698. He served in Holland under the Prince of Orange; at twenty-three was appointed colonel of a

regiment in Normandy, and at twenty-six was made a brigadier. Having served in Italy, Flanders, and Germany with marked success, he was appointed governor of New France (as the Canadian possessions were then called) in 1692. Frontenac modeled his government upon the old feudal pattern and brought upon him a severe rebuke from the King of France. Frontenac quarreled with the Jesuits, then all-powerful in Canada, and had a dispute with the governor of Montreal. Duchesneau was sent to Canada to administer the civil affairs of the province, Frontenac being allowed to retain the command of the army. Their relations became critical; Duchesneau sided with the Jesuits, while Frontenac violently opposed. The quarrel continued until both were recalled in 1682. In 1689, when the Iroquois were threatening Montreal, Frontenac was recalled. Though an old man, he was able to revive the courage of the colonists and to gain the respect of the Indians. He sent three war parties of French and Indians against the English, and finally repulsed Sir William Phips before Quebec in 1690. In 1696 he led an army into the heart of New York and laid waste Onondaga and Oneida. This with the successes of Iberville in Newfoundland and on Hudson Bay restored the fallen fortunes of the French. Though of a quarrelsome temper, Frontenac gained the respect and affection of the Indians by his conciliatory spirit and firmness.

FROSTBURG, a village of Allegheny county, Md., located on a plateau between Dan's and Savage mountains, 1,792 feet above sea-level and over the coal-basin of Western Maryland. The village has a fire-brick manufactory and foundries. Population (1890), 3,804.

FROTH-FLY, also called **FROTH-HOPPER**, **FROG-HOPPER**, **FROG-SPIT**, numerous insects parasitic on plants, on which the larvæ and pupæ are found surrounded by a frothy spittle. They are of the family *Cicadellidae*, order *Homoptera*, and are related to the amphideæ, cicadas, and lantern-flies. The family, which is large, consists of plant parasites, mostly small in size, often very beautiful in form and color. The young stages, which are very like the adults, except in the absence of developed wings, suck their plant hosts, and thereupon surround themselves with the familiar froth which issues from the hind end of the gut, and which is popularly called cuckoo-spit or frog-spittle, from fancies entertained as to its origin. It is sometimes so abundant, on willows for instance, that it drops from the branches. In some cases it may be helped by an exudation from the wounded plants. The adults have long hind-legs, and are able to hop about with some activity.

FROTHINGHAM, **NATHANIEL LANGDON** (1793-1870), an American clergyman. For a while he was an instructor in Harvard University, and from 1815 to 1850 was pastor of the First Congregational church (Unitarian) in Boston. He contributed to various religious periodicals, and published, besides many sermons, *Deism or Christianity* (1845); *Sermons in the Order of a Twelve-month* (1852); and *Metrical Pieces, Translated and Original* (1855).

FROTHINGHAM, **OCTAVIUS BROOKS**, an American author, born in 1822. In 1847 he was ordained pastor of the North church (Unitarian) at Salem, Mass. In 1855-59 he was pastor in Jersey City, N. J., and in 1860-79 had charge of the Third Unitarian Congregational Church, New York city. In 1881 he withdrew from specific connection with any church, and devoted himself to literature. Mr. Frothingham has contributed to various periodicals,

and published, besides more than 150 sermons, *Stories from the Lips of the Teacher* (1863); *Stories from the Old Testament* (1864); *Child's Book of Religion* (1866); *The Religion of Humanity* (1873); *Life of Theodore Parker* (1874); *Transcendentalism in New England* (1876); *The Cradle of the Christ* (1877); *Life of Gerrit Smith* (1878); *Life of George Ripley* (1882); and *Memoir of William Henry Channing* (1886).

FROTHINGHAM, **RICHARD** (1812-80), an American historian. For years he was proprietor, and in 1852-65 managing editor, of the Boston, Mass., "Post." In 1839, 1840, 1842, 1849 and 1850 he was a member of the Massachusetts legislature, and in 1851-53 was mayor of Charlestown. For several years he was treasurer of the Massachusetts Historical Society. He is the author of *History of Charlestown* (1848); *History of the Siege of Boston* (1849); *The Command of the Battle of Bunker Hill* (1850); *Life of General Joseph Warren* (1865); *Tribute to Thomas Starr King* (1865); and *Rise of the Republic* (1871); besides many addresses.

FROUDE, **JAMES ANTHONY**, an eminent English historian, youngest son of the Archdeacon of Totnes, born at Dartington, Devonshire, April 23, 1818. He was educated at Westminster and Oriel College, Oxford, and was elected a Fellow of Exeter College in 1842. He took deacon's orders in 1844, but having altered his religious views he wrote in 1848 a work entitled *The Nemesis of Faith*, in which the solemnity and sadness of religious scepticism are relieved by a singularly tender and earnest humanity. The book was written with great power, and cost Froude his fellowship and an educational appointment in Tasmania. For the next few years he employed himself in writing for "Frazar's Magazine" and the "Westminster Review," and in 1856 issued the first two volumes of his *History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*, completed in 12 volumes in 1869. In this work Froude displays supreme literary ability, but, like Macaulay, who in the art of making history as fascinating as fiction is his only rival, he is a man of letters first and an historian afterwards, and the defects of his merits have sadly impaired the permanent value of his work; his views of men and motives are always distorted by being seen through 19th century spectacles; and these, moreover, spectacles of his own. Four volumes of brilliant essays and papers, entitled *Short Studies on Great Subjects*, appeared between 1867 and 1882. He became rector of St. Andrew's University in 1869, and received the degree of LL. D. His next history, in 13 volumes (1871-74), was *The English in Ireland in the 18th Century*. In 1874, and again in 1875, Froude visited the South African colonies on a mission from the home government, and published his impressions in *Two Lectures on South Africa*, in 1880. As Carlyle's literary executor Froude edited his *Reminiscences* in 1881, Mrs. Carlisle's *Letters* in three volumes, in 1882, and Carlyle's own *Life* in four volumes (1882-84). Among his several later works are *The Two Chiefs of Dunboy*, published in 1889, an historical romance of Irish life toward the close of the 18th century; and *A Life of Lord Beaconsfield*, in 1890.

FROZEN STRAIGHT, a passage about 15 miles wide, separating Southampton Island, in the north of Hudson Bay, from Melville Peninsula.

FRYE, **WILLIAM PIERCE**, a United States Senator, born in 1831, graduated at Bowdoin College, Maine, 1850; studied and practiced law; was a member of the State legislature in 1861, '62, and '67; was mayor of the city of Lewiston in 1866-67; was attorney-general of the State of Maine in 1867

'68, and '69; was elected a member of the National Republican Executive Committee in 1872, reelected in 1876. In 1880 he was elected a trustee of Bowdoin College; received the degree of LL.D. from Bates College in July, 1881, and the same degree from Bowdoin College in 1889. He was a presidential elector in 1864; was a delegate to the National Republican conventions in 1872, '76, and '80; was elected chairman of the Republican State Committee of Maine in place of Hon. J. G. Blaine, resigned in November, 1881; was elected a Representative in the 42d, 43d, 44th, 45th, 46th and 47th Congresses; was elected to the United States Senate as a Republican to fill the vacancy occasioned by the resignation of James G. Blaine, appointed Secretary of State; took his seat March, 1881, and was reelected in 1883, and again in 1888. His term of service will expire March 3, 1895.

FRUCTED. Trees when represented as bearing fruit are said, heraldically, to be fructed.

FRUCTIFICATION, a term frequently employed in cryptogamic botany, sometimes to denote the whole reproductive system, and sometimes the fruit itself.

FRUIT-PIGEON (*Carpophaga*), a genus of pigeons, including about fifty species, distributed over the whole Australian and Oriental regions, but much more abundant in the former. They live in forests, are well adapted for arboreal life, and feed on fruits. The gape is wide; the coloring of the plumage brilliant. The term fruit-pigeon is also extended to members of other genera—*treron*, *electras*, etc.

FRUITPORT, a summer resort and center of a fruit region in Muskegon county, Mich., at the mouth of Grand River. It has a magnetic mineral spring.

FRUSTUM: in geometry, the part of a solid next the base, left on cutting off the top by a plane parallel to the base. The frustum of a sphere or spheroid, however, is any part of these solids comprised between two circular sections, and the middle frustum of a sphere is that whose ends are equal circles, having the center of a sphere in the middle of it, and equally distant from both ends.

FRYKEN, a lake, or rather chain of lakes, in Sweden, stretching from north to south over a distance of about 40 miles and discharging into Lake Wenner by the Nors. They are surrounded by some of the finest scenery in Sweden.

FRYXELL, ANDERS, a Swedish historian, born Feb. 7, 1795, in Dalsland, died at Stockholm, March 21, 1881. He took priest's orders in 1820, and in 1828 became rector of a gymnasium in Stockholm. From 1847 until his death he devoted himself entirely to literary pursuits. His reputation rests upon *Berättelser ur Svenska Historien* ("Narratives from Swedish History" (46 vols., Stockholm, 1832-80). These narratives, largely biographical in form, soon obtained popularity in Sweden, and parts of them have been translated into almost all European languages. Another work, *Conspiracies of the Swedish Aristocracy* (4 vols. Upsala, 1845-50), was intended as a reply to the accusations urged against that class by Geiger and others, and involved Fryxell in a keen controversy with the democratic liberal party in Sweden. Besides these works he wrote a *Contribution to the History of the Literature of Sweden* (9 vols., 1860-62).

FUCA, or **JUAN DE FUCA**, STRAIT, a passage separating the State of Washington from Vancouver Island, and connecting the Pacific Ocean with the Gulf of Georgia. It contains several islands, one of which, San Juan, became the subject of a dispute between Great Britain and the United States, the question being whether it belonged to Washington (then

a territory) or to British Columbia. In 1872 the emperor of Germany, as arbiter, decided that the line of boundary should be run through the Strait of Haro, west of San Juan, thus awarding that island to the United States, and it and several neighboring islands now form a county of Washington. The county of San Juan had in 1880 a population of 948.

FUCACEÆ, a group of coarse olive-green seaweeds, belonging to the *Oösporeæ*. About 600 species are known, growing mostly in saltwater. Some attain a great size; *Macrocystis pyrifera* is said to have fronds 500 to 1,500 feet in length. Most of the *Fucaeæ* contain iodine in great quantity. They are also valuable for the soda they contain, which is an article of commerce.

FUENTE-ALAMO, a town of Spain, 18 miles south of Murcia. It is at the northern base of a range of hills, and at a short distance from the canal of Murcia. Population, 808.

FUENTE DE OVEJUNA, a small walled town of Spain, in the province of Cordova, is situated on the crest and sides of a conical hill, between two of the upper branches of the Guadati. It has manufactories of linens, woollens, and leather. Population, 2,919.

FUENTES DE ONORO (the Fountains of Honor), a small village of Salamanca, Spain, on the Portuguese frontier, 14 miles west of Ciudad Rodrigo. This place is celebrated as the scene of one of the important battles of the Peninsular War, between the French under Massena and the English under Wellington.

FUERTÉ DE ANDALGALA, or **ANDALGALA**, a town of the Argentine Republic, in the province of Catamarca, 75 miles north of Catamarca, in a mountainous district. Population, 3,073.

FUERTE, or **VILLA DEL FUERTE**, a town of Mexico, in the province of Sinaloa, 75 miles north of Sinaloa, on the Rio del Fuerte. It is a place of commercial importance. Population, 5,000.

FUGARA, a name applied to a stop of small scale, in organs, made of wood or metal. In tone it is as piercing as the *gamba*, but much clearer.

FUGITIVE SLAVE LAWS. See **UNITED STATES**, Britannica, Vol. XXIII, pp. 747, 751, 768, 770.

FUGLEMAN, an intelligent soldier placed in front of a line of men at drill to give the time and an example of the motions in the manual and platoon exercises.

FUGUE is the form of musical composition in which all devices of counterpoint, or the art of combining independent ideas in music, find their most fitting use. The laws which govern it are as strict as numerous, and can only be thoroughly understood by an exhaustive study of technical works.

FÜHNEN, the largest of the Danish islands after Seeland, bounded on the west by the Little Belt, on the north by Odensee Fjord, on the east by the Great Belt, and on the south by the island of Langeland. The coast is rugged and much indented with bays, but the interior is generally flat. It is fruitful and well cultivated, producing abundant crops of cereals. Barley, oats, buckwheat, rye, flax, and hemp are grown in large quantities; honey is also largely exported. The Fühnen horses are in great request, and a large number of them are annually sent out of the island. Population, 204,904.

FULAHS, a people of the Soudan, extending from Senegal in the west to Darfur in the east, and from Timbaktu and Haussa in the north to Joruba and Adamawa in the south. Their ethnographic relations are not yet definitely settled, some ally-

ing them with the Soudan negroes, some with the Nuba of the Nile region, and others regarding them as an isolated race. There appear to be two distinct branches, a dark-skinned division, having its center in Bornu and Adamawa, and an olive-skinned division, occurring chiefly in Sokoto. All are strong and well-built, with long hair and regular Caucasian features. They are very intelligent, have a frank, free bearing, are trustworthy, possess considerable self-respect and decision of character, and are devoutly religious. These people are also industrious, their occupations being agricultural, trading, and cattle raising; they also work iron and silver, manufacture articles of wood and leather, and weave various durable fabrics. They probably number from seven to eight millions, and almost all their towns contain mosques and schools.

FULLER, MELVILLE W., born in Augusta, Me., February 11, 1833; graduated at Bowdoin College in 1853. He studied law at Bangor, Me., and at Harvard, and in 1855 began practice in his native city. Here he edited the *Augusta Age*, became president of the common council, and in 1856 city attorney. In the last-named year he removed to Chicago, where, for thirty-two years, he conducted a highly successful law practice. Mr. Fuller was a member of the Illinois Constitutional Convention in 1862, and of the Illinois House of Representatives in 1863. A strong Democrat, he served as a delegate to all the national conventions from 1864 to 1880, inclusive. President Cleveland nominated him chief justice of the United States Supreme Court, April 30, 1888, and he was confirmed by the Senate July 20th, and took the oath of office October 8th, following. He is LL.D. of Bowdoin College and of the Northwestern University.

FULLER, SARAH MARGARET, Marchioness Ossoli (1810-50), an American authoress. For awhile she taught school in Boston, Mass., and Providence, R. I. In Boston the leaders of the transcendental movement were her intimate friends; here she edited *The Dial*, translated from the German, and wrote *Summer on the Lakes* (1843). In 1844 she published *Woman in the Nineteenth Century*, and in the same year she proceeded to New York, on the invitation of Horace Greeley, then editor of the *Tribune*, and contributed to that journal a series of miscellaneous articles. In 1846 she visited Europe, where she met many of the foremost people in the literary, social, political, and reformatory world, and in 1847 married Giovanni Angelo, Marquis Ossoli. She entered with zeal into the Italian struggle for independence in 1849, and her conduct during the siege of Rome by the French was of the most heroic, humane, and tender kind. In May, 1850, with her husband and son, she sailed for America, but the vessel was wrecked off Fire Island Beach, L. I., and all on board perished. Besides many contributions to magazines and papers, she wrote *Summer on the Lakes* (1843); *Woman in the Nineteenth Century* (1844); and *Papers on Literature and Art* (1855).

FULLERTON, the county-seat of Nance county, Neb. It is the seat of Nebraska Wesleyan University. Population (1890), 1,200.

FULLERTON, LADY GEORGIANA, writer of religious novels, daughter of the first Earl Granville, born in Staffordshire, Sept. 23, 1812, died at Bourne-mouth, Jan. 19, 1885. In 1833 she married Alexander Fullerton, and two years afterward published her first story, *Ellen Middleton*. Under the influence of the Tractarian movement she became, in 1844, a convert to Roman Catholicism. The rest of her life was devoted to charitable works and the composition of religious stories, among which

were *Grantley Manor*; *Constance Sherwood*; *A Stormy Life*; *Mrs. Gerald's Niece*; and *Gold-digger and Other Verses*.

FULMINIC ACID has never been isolated in the hydrated form, but its formula doubtless is $C^2N^2H^2O^2$, the hydrogen acting the part of a base. See *Explosives*, Britannica, Vol. VIII, p. 808.

FULNEK, a town of Moravia, ten miles from Neutitschein, with a Capuchin convent, and manufacturing of silk, cloth, and fezes. It was formerly a principal seat of the Moravian brethren, and gave its name to Fulneck in Yorkshire, near Bradford, England, where a Moravian settlement was established in 1748.

FULTON, a town in Fulton township, Whiteside county, Ill., an important railroad junction and the depot of much grain from Wisconsin, Minnesota, and northwestern Illinois. It has a large elevator, carriage, pipe, and stoneware factories, and is the seat of Northern Illinois College.

FULTON, a city of Fulton county, Ky., contains two seminaries, and establishments where cotton-ginning and wool-carding are carried on, and where wagons, tobacco, lumber, and flour are manufactured. Population, 1,818.

FULTON, a city and county-seat of Callaway county, Mo. It contains Westminster College, State asylums for the deaf and dumb, and for the insane, and two State institutions under Presbyterian control. Population (1890), 4,814.

FULTON, a village of Oswego county, N. Y., on Oswego River, 12 miles from Oswego. It has good water-power, several manufactories, and a seminary. Population (1890), 4,214.

FULTON, JOHN, an American P. E. clergyman, born in Scotland in 1834. He emigrated to America in 1858, and took priest's orders in 1858. He has devoted much time to study regarding the canon law, and is one of the ablest canonists in his denomination. He resides in St. Louis. Among his works are *Letters on Christian Unity* (1868); *Index Canonum* (1872); *Laws of Marriage* (1883); and *Documentary History of the Protestant Episcopal Church in the Confederate States*.

FULTONVILLE, a village of Montgomery county, N. Y., on the Mohawk River and Erie Canal, 40 miles west of Albany. It has steam mills, an elevator, a foundry, and machine shops.

FUM, or, more properly, Fung, the Chinese Phoenix, one of the four symbolical animals supposed to preside over the destinies of the Chinese empire. Its appearance indicates an age of universal virtue, the influence of which has extended throughout creation. It is supposed to have the forehead of a goose, hind-quarters of a stag, neck of a snake, fish's tail, fowl's forehead, down of a duck, dragon's marks, the back of a tortoise, face of a swallow, and beak of a cock, with claws and feathers of various colors, red crest and golden beak.

FUMIGATING PASTILS are composed of various ingredients, which, by their smoldering combustion, evolve agreeable odors. They are prepared by taking benzoin and dry balsam of Peru, each 16 parts, sandalwood, 4 parts, labdanum, 1 part, charcoal from limetree wood, 96 parts, nitrate of potash, 2 parts, and mucilage of tragacanth, enough to form the mixture into a paste, from which conical pastils are to be made by a small mold.

FUMIGATION, the cleansing or medicating of the air of an apartment by means of vapors, employed chiefly for the purpose of detaching infectious poisons from clothing and furniture. Most of the methods of fumigation formerly employed have little real value, and are to be looked on chiefly as grateful to the senses; as, for instance,

the burning of frankincense. For the really active processes, see DISINFECTANTS, *Britannica*, Vol. VII, p. 258.

FUNDI, a light and nutritious grain raised in West Africa, highly esteemed as food for invalids.

FUNDY, BAY OF, an arm of the Atlantic, separating Nova Scotia from New Brunswick, and branching at its head into two inlets, Chignecto Bay and Minas Basin, which are separated by narrow necks of land from the Gulf of St. Lawrence. It has an extreme breadth of 45 miles and a length up to Chignecto Bay of 140 miles; it receives the St. John, the principal river of New Brunswick, and the St. Croix, which separates that province from Maine. The navigation is rendered perilous by the tides, which rush in with impetuous force, rising rapidly from 60 to 70 feet.

FÜNEN, or **FÜHNEN** (Dan. *Fyen*), the largest of the Danish islands after Zealand, is separated from Sleswick and Jutland on the W. by the Little Belt, and from Zealand on the E. by the Great Belt. With the islands of Langeland, Årø, Taasinge, etc., it forms the two administrative districts of Odense and Svendborg. Area of Fünen, 1,135 square miles; population (1893), 206,528.

FUNSTON, EDWARD H., member of Congress from the second district of Kansas, was born in Clarke county, Ohio, in 1836. Educated in the common schools, New Carlisle Academy and Marietta College, he entered the army in 1861 as lieutenant in the sixteenth Ohio battery. Mustered out in 1865, he located in Kansas, and was member of the Kansas house of representatives 1873-75, of which he was speaker in 1875. He was elected State senator in 1880 and was made president *pro tempore* of the senate. He has been a member of Congress since 1882.

FURFURAMIDE, **FURFURINE**, and **FURFUROL**. When starch, sugar or bran is acted upon by dilute sulphuric acid and peroxide of manganese, the distillate contains not only formic acid, but also a small quantity of an essential oil, which, after being purified by redistillation, is colorless, has a fragrant odor somewhat resembling that of bitter almonds, and when dissolved in cold sulphuric acid forms a beautiful purple liquid. This oil is termed *furfurol*. If *furfurol* be treated with ammonia, it is converted into *furfuramide*, which occurs in colorless crystals, insoluble in water, but soluble in alcohol. If *furfuramide* is boiled with a solution of potash, it dissolves, its elements assume a new arrangement, and the solution on cooling deposits long silky needles of a powerfully alkaline base, *furfurine*, which is isomeric with *furfuramide*. It is dissolved by dilute acids, and on adding ammonia to these solutions the alkaloid is precipitated unchanged.

FURNEAUX ISLANDS, a group of islands in Bass's Strait. They are numerous, the largest being 35 miles in length, 10 miles in breadth. The soil is sandy and the vegetation feeble.

FURNES, a small town of Belgium, near Dunkirk. Four important lines of canal meet at this town, and it has tanneries and linen manufactures, as well as a considerable trade in horses, cattle, hops and cheese. Population, 5,322.

FURNES, HORACE HOWARD, an American author born in 1833. He graduated at Harvard in 1854, traveled three years in Europe, and in 1859 was admitted to the Pennsylvania bar. He has been a diligent student of Shakespeare, and undertook the editing of a new *variorum* edition, several volumes of which have been issued.

FURNES, WILLIAM HENRY, an American Congregational Unitarian clergyman, born in 1802. In 1825 he was ordained to the first C. U. church in Philadelphia, Pa., where he remained until 1875,

when he retired from the ministry. From 1845 to 1847 he edited an annual called "The Diadem." He translated from the German several noted works.

FURNISS, HARRY, a caricature artist, was born March, 1854, at Wexford, Ireland, of English parents. He was educated in Dublin, and began drawing for periodicals and magazines at a very early age. Mr. Furniss went to London at the age of nineteen, and has ever since been constantly engaged in illustrating. For many years he was a regular contributor to the *Illustrated London News*, mostly depicting the lighter side of every-day life, but occasionally acting as a serious "special" for that paper. In the latter capacity he made a sketching tour of the distressed parts of England in the winter of 1878, and has followed political campaigns through the country, etc. His first drawing in *Punch* appeared in 1880, and he joined the regular staff four years after; at this time his *Punch* Parliamentary Views were collected and published in an *édition de luxe*. His principal works in *Punch* are Parliamentary Scenes and Sketches of Members, with few exceptions drawn direct in the houses and finished in the studio. Besides his work in *Punch* he has illustrated the following works published from the same office: F. C. Burnand's *Happy Thoughts*; A'Beckett's *Comic Blackstone*, colored plates, and Burnand's *Incomplete Angler*. He has contributed drawings to nearly all the chief magazines in London, Harper's in America, and others, and to numerous papers, the *World* and *Vanity Fair* among them. He has also brought out books for children, with colored pictures, entitled "Roms." In 1890 he was elected a Fellow of the Institute of Journalists.

FURNITURE, the name applied to an organ-stop, or register, consisting of two or more ranks of pipes to each note.

FURNIVALL, FREDERICK JAMES, M.A., Ph.D., born Feb. 4, 1825, at Egham, in Surrey, received his education at private schools at Englefield Green, Turnham Green and Hanwell, at University College, London (1841-42), and Trinity Hall, Cambridge, B.A. 1846, M.A. 1849. He was called to the bar in 1849, but has devoted his life mainly to the study of Early and Middle English Literature, and has established numerous societies of which he is director for promoting the study of special works: the Early English Text, 1864; the Chaucer, 1868; the Ballad, 1868; the New Shakespeare, 1873; the Wyclif, 1882; the Browning, 1881; and the Shelley, 1885. Through his societies Dr. Furnivall has raised and expended over £40,000 in printing early MSS. and rare books. He was also one of the founders of the Working Men's College, and taught there for many years besides being a captain in its volunteer corps and president of its boat club. He was one of the first builders of narrow waver-boats (1845), and introduced sculls instead of oars into fours and eights. Dr. Furnivall has edited a large number of early English and other works, among which may be mentioned Walter Map's *Queste del Saint Graal*; Percy's *Folio MS. of Ballads and Romances*; *The Babes Book*; Harrison's *England*, 1577-87; Caxton's *Book of Curtesye*; a Six-Text print of Chaucer's *Canterbury Tales*—a very valuable aid to the study of Chaucer—and parallel-text editions of the poet's *Minor Poems* and *Troilus and Cressida*, etc. To these may be added several of the Shakespeare quartos in fac-simile, and the introduction to a one-volume edition of the works, called *The Leopold Shakespeare*.

FURY AND HECLA STRAIT, in 70° N. lat., separates Melville Peninsula from Cockburn Island, and connects Fox Channel with the Gulf of Boothia. It was discovered by Parry in 1822, and named after his ships.

FUSAN, one of the three open ports of Corea, on the southeast shore of the peninsula, and practically a Japanese settlement, under a treaty of 1876. The trade is almost entirely in Japanese hands, and in 1888, of 2,614 foreigners, the Japanese numbered 2,595. The imports in 1887 (chiefly Manchester goods, salt, and Japanese wares) were valued at \$659,000, the exports (rice, beans, hides, etc.), excluding specie, at \$394,000. There are good custom stores, and regular communication by steamers with Shanghai, Nagasaki, and Vladivostok, and by telegraph with Seoul.

FUSARA, LAKE OF, a small lake of Italy, eleven miles west of Naples, called by the Romans *Acherusia Palus*. It is near the site of the ancient Cumæ, and during the Roman empire its banks were studded with villas. Numerous remains of massive buildings, houses, and tombs are still to be seen in the neighborhood. The water of the lake is brackish. Oysters have been cultivated here since the time of the Romans.

FUSILIERS, formerly soldiers armed with a lighter fusil or musket than the rest of the army; but at present all regiments of foot carry the same pattern of rifle. Fusilier is, therefore, simply an historical title borne by a few regiments of the British army.

FUSTEL DE COULANGES, NUMA DENIS, born at Paris, March 18, 1830, died Sept. 12, 1889. After filling several chairs successively at Amiens, Paris, and Strasburg, he was transferred in 1875 to the École Normale at Paris, and became a member of the Institute in the same year. His earlier writings, *Mémoire sur L'île de Chio* (1857), and *Polybe, où la Grèce conquise par les Romains* (1858), had hardly prepared the reading public for the altogether exceptional importance of his brilliant book, *La Cité Antique* (1864; 10th ed. 1885), which threw a flood of fresh light on the social and religious institutions of antiquity. The work was crowned by the French Academy, as was also his profoundly learned and luminous *Histoire des Institutions Politiques de l'Ancienne France* (Vol. I, 1875).

FUSUS, a genus of gasteropodous mollusks nearly allied to *Murex*, having a spindle-shaped shell with a very elevated spire, the first whorl

often much dilated, and a straight elongated canal. The whorls are not crossed by varices, as in *Murex*. About 100 existing species have been described, and more than three times that number of fossil ones.

FUTAK, a town of lower Hungary, in the county of the Lower Bacs, situated on the left bank of the Danube. It has a beautiful castle and garden. It produces great quantities of vegetables and tobacco, and has an extensive trade in corn. Population, 7,900.

FUTTUHA, or Futwa, a town of India, in the district of Patna, and sub-presidency of Bengal, stands at the confluence of the Punpun and the Ganges. As the Ganges is here deemed peculiarly sacred, Futtuha is, at certain seasons of the year, the resort of vast numbers of pilgrims. Population, 11,295.

FUTTYGURH, a military cantonment of Furrackabad, about three miles to the east of that city, on the left bank of the Ganges, being in latitude 27° 22' north, and longitude 79° 41' east. Population, 10,335.

FUTURE STATE, the condition of the future life, which will continue forever. A belief in immortality has been held in connection with a belief in God by all nations in every age of the world. The traditions of the most civilized nations favor the belief that it originated in divine revelation, while its universality would seem to show that it has its foundation in the innate sentiments of our nature. For what Christian speculation has concluded about a future state, see ESCHATOLOGY, *Britannica*, Vol. VIII, pp. 535-538.

FYAN, ROBERT W., a lawyer, born in Bedford county, Pa., March 11, 1835, and removed to Marshfield, Mo., in 1858. He was an officer in the Confederate army during the war of the Rebellion; was circuit attorney of the Fourteenth Judicial Circuit in 1865 and 1866, and judge of the same circuit from April, 1866, to January, 1883, when he resigned. In politics a Democrat, he was a member of the Missouri Constitutional Convention of 1875; was elected a Representative from the Fourteenth Congressional District of Missouri to the 48th Congress, and in 1890 was elected from the same district to the 52d Congress. He was reelected in 1892.

G

GABBRO—GAGERN

GABBRO, a rock consisting essentially of the two minerals plagioclase feldspar and diallage. It shows a thoroughly crystalline granitoid texture, with no trace of any base. The plagioclase is a basic variety—labradorite being commonest; but anorthite is also sometimes present in abundance. The diallage may usually be noted by the pearly or metalloid luster on its cleavage planes. It is usually also brownish or dirty-green in color. Olivine is also often a constituent of gabbro, and some apatite is almost invariably present. In certain kinds of gabbro other varieties of pyroxene appear; and among other minerals which occasionally occur in gabbro may be mentioned hornblende, magnesia, mica, magnetite, ilmenite, quartz. The rock is of igneous origin, and occurs in association with the crystalline schists as large amorphous masses or bosses. Sometimes it appears in the form of thick sheets and bosses, associated with volcanic eruptive rocks.

GABELLE: in France, a word sometimes used to designate every kind of indirect tax, but especially the tax upon salt. This impost, levied in 1286 by Philippe IV, was meant to be only temporary, but was declared perpetual by Charles V. It was unpopular from the first, and the attempt to collect it occasioned frequent disturbances. It was finally suppressed in 1789. The word gabelle also indicated the magazine in which salt was stored.

GABERLUNZIE, an old Scotch term for a beggar.

GABORIAU, ÉMILE, the great master of "police novels," born at Saujon in Charente-Inférieure, in 1835, died Sept. 28, 1873. He had been a contributor to some of the smaller Parisian papers, when he leaped suddenly into fame with his story, *L'Affaire Lerouge* (1866) in the feuilleton to *Le Pays*. This was quickly followed by other works of note.

GABRIEL CHANNEL, between Tierra del Fuego and Dawson's Island, is about 25 miles in length, and varies in width from two to three miles at the extremities to half a mile midway. The shores are abrupt masses of rock rising to the height of 1,500 feet. The channel is subject to violent whirlwinds.

GACHARD, LOUIS PROSPER, writer on the history of Belgium, born at Paris, March 12, 1800, died Dec. 24, 1885. He spent the greater part of his life as keeper of the archives at Brussels. He edited from the national archives of Belgium and Spain the correspondence of William the Silent, Philip II, Margaret of Austria, and Alba, and wrote *Les Troubles de Gand sous Charles V.* and *Retraite et Mort de Charles V.*, besides other books dealing with the history of Belgium.

GADE, NIELS WILHELM, musical composer, born at Copenhagen, Feb. 22, 1817. He became known by his *Echoes of Ossian*, studied at Leipzig, and was Mendelssohn's successor as leader of the Gewandhaus concerts. In 1868 he was appointed master of the Chapel Royal at Copenhagen. He has composed symphonies, an octet, the *Erl King's Daughter*, and other works. Gade died in 1890.

GADFLY, an insect of the genus *Cestrus*, which stings cattle and horses, and deposits its eggs in their skin, one in a place, which, hatching, live on the integument under the skin until fitted to emerge. The maggot then drops to the ground,

where it burrows, and undergoes its transformation to the perfect fly. The ovipositor of the female is formed of a horny substance, and consists of four telescopic tubes, of which the last terminates in hooked joints. In depositing her egg the fly does not remain longer than a few seconds on the animal's back. The cattle are said to exhibit alarm and excitement at the presence of a gadfly. About twenty species are known in the United States, some native, and some imported with our domesticated animals. See *Britannica*, Vol. VII, p. 256.

GADSDEN, the county-seat of Etowah county, Ala., on the Coosa River. Yellow-pine lumber is here manufactured, and in the vicinity coal and iron are found. Population (1890), 2,901.

GADSDEN, CHRISTOPHER (1724-1805), an American patriot. He received his education in England; from 1741 to 1745 he was a clerk in a counting-house in Philadelphia, and then made a second visit to England. After his return to America he engaged in business on his own account, and accumulated a small fortune. In 1765 he was a delegate to the first Colonial Congress, and in 1774 to the first Continental Congress. At the beginning of the Revolutionary war he entered the army as a colonel, and in September, 1776, was promoted to the rank of brigadier-general. For a time he was lieutenant-governor of South Carolina, and was a framer of the State constitution. He signed the capitulation when Charleston was taken by Sir Henry Clinton in 1780, and, refusing a parole, was imprisoned for forty-two weeks. In 1782 he was elected governor of South Carolina, but declined the office on account of his age.

GADSDEN, JAMES (1788-1858), a United States statesman. He served in the war of 1812 as lieutenant-colonel of engineers, and later was Jackson's aid in the expedition to examine the military defenses of the Gulf of Mexico and the southwestern frontier. In 1818 he served in the Seminole campaign. In 1822 he retired from the army, and settled in Florida as a planter. In 1824 he became a member of the territorial council; was a commissioner to remove the Seminoles from northern to southern Florida, and in 1853 was made minister to Mexico. He shortly after retired to private life.

GADSDEN PURCHASE, a name given to that portion of New Mexico and Arizona which was purchased from Mexico by Gen. James Gadsden for the United States, Dec. 30, 1853. The Government paid \$10,000,000 for the territory, which comprised an area of 45,535 square miles.

GAGE, MATILDA JOSLYN, an American reformer, born in 1826. From 1852 to 1861 she spoke on reform measures, and advocated the abolition of slavery. From 1878 to 1881 she edited the *Syracuse, N. Y., "National Citizen"*, and is the author of *Woman As An Inventor* (1870). With Susan B. Anthony and Elizabeth Cady Stanton she compiled the *History of Woman Suffrage* (1881-86).

GAGERN, HEINRICH WILHELM AUGUST, FREIHERR VON (1799-1880), a German statesman, born at Baireuth, Aug. 20, 1799. He was one of the founders of the student movement of 1815-19. After holding office under the government of Hesse-Darmstadt down to 1848, he became in that

year one of the leading politicians of the Frankfurt parliament, of which he was elected president. In 1849 he resigned his position, and shortly after retired to private life. Pensioned off in 1872, he died at Darmstadt, May 22, 1880.

GAINES, EDMUND PENDLETON (1777-1849), an American soldier. He entered the army in 1799; became major, then colonel, and in 1814 brigadier-general. The same year he was brevetted major-general for gallant conduct at Fort Erie, where he was severely wounded. He also received the thanks of Congress, with a gold medal. He was afterwards active against the Seminoles in Florida, and in 1836 conducted an expedition against Osceola, in which he was again severely wounded.

GAINES, MYRA CLARK (1805-85), an American heiress, wife of Gen. E. P. Gaines. She is known through the extraordinary lawsuit with which her name was associated, and through which she became heir to her father, Daniel Clark, whose fortune was estimated at \$35,000,000. Clark died in 1813, and his estate was disposed of under the provisions of a will dated 1811. Some time afterward, however, witnesses were found who had seen and read a will, dated 1813, which left the entire fortune to Myra; and in 1856, although this will was never discovered, the Supreme Court of Louisiana decided that the missing will should be received as the last will of Daniel Clark. Only a small portion of the original fortune, however, came into the possession of the claimant, the rest having been swallowed up in the legal proceedings that preceded the final victory.

GAINESVILLE, a health resort of Florida, and the county-seat of Alachua county. It contains a State normal school. Population, 2,790.

GAINESVILLE, the county-seat of Hall county, Ga., situated on the summit of the Chattahoochee ridge that divides the waters of the Gulf and the Atlantic. It has mills, machine shops, car shops, a college; and its fine springs, which are chalybeate, limestone, and freestone, make it a health resort. Population, 3,202.

GAINESVILLE, the county-seat of Cooke county, Texas, eight miles south of Red River. It contains educational institutions, and the chief business of the people is stock-raising and farming. Pop. 6,594.

GAIRDNER, JAMES, historian, born at Edinburgh, March 22, 1828; attended lectures in the University there, and at 18, as a clerk, entered the Public Record office in London, where he became assistant keeper in 1859. He has distinguished himself by the rare combination of profound erudition, patient accuracy, and judicial temper which he has shown in the editing of a long series of historical documents.

GAIRDNER, WILLIAM TENNANT, a distinguished physician, born in 1824. He graduated M. D. at Edinburgh in 1845, becoming fellow of the Royal College of Physicians there in 1850, and afterward LL. D. of Edinburgh, and M. D. of Trinity College, Dublin. He was appointed by the crown in 1862 to the chair of practice of medicine in Glasgow University; was president of the medical association there in 1888, and is physician in ordinary to the Queen for Scotland. He has contributed many valuable papers to medical journals.

GAIRLOCH, an inlet of the sea on the West coast of Ross-shire, six miles in length, which gives name to a parish and village.

GAISFORD, THOMAS, D. D. (1780-1855), a distinguished classical scholar, born at Ilford, Wilts, in 1780, graduated at Christ Church, Oxford, in 1804, and in 1811 was appointed regius professor of Greek at Oxford. From 1819 to 1847 he was rector of Westwell, Oxfordshire. In 1831 he became dean of

Christ Church. He died in 1855, and in his memory a Greek prize was founded at Oxford.

GALATONE, a very ancient town in the south of Italy, in the province of Lecce, about nine miles northeast of Gallipoli, situated in a very rich but insalubrious plain. Population, 5,559.

GALA WATER, a stream of Edinburgh, Selkirk, and Roxburgh shires, Scotland, rising among the Moorfoot Hills, and winding 21 miles south-southeast past Stow and Galashiels, where, after a total descent of 800 feet, it falls into the Tweed, a little below Abbotsford, and $2\frac{1}{2}$ miles west of Melrose. In its valley, the ancient Wedale, Skene localizes one of Arthur's battles.

GALAXY, or the MILKY-WAY, the great luminous band which nightly stretches across the heavens from horizon to horizon, and which forms a zone very irregular in outline, but completely encircling the whole sphere almost in a great circle, inclined at an angle of 63° to the equinoctial. At one part of its course it opens up into two branches, one faint and interrupted, the other bright and continuous, which do not reunite till after remaining distinct for about 150° . Its luminosity is due to innumerable multitudes of stars, so distant as to be blended in appearance, and only distinguishable by powerful telescopes.

GALE, or SWEET GALE, a species kindred to the North American candleberry, and widely distributed through the peaty uplands of the Northern hemisphere. Its leaves and berries are dotted with resinous oil-drops, which have a most agreeable fragrance, and formerly gave it a most extensive range of uses in the domestic economy.

GALENA, a city and the county-seat of Jo Daviess county, Ill., situated on the Fevre River, six miles from its entrance into the Mississippi. By railroad it is 19 miles east-southeast of Dubuque, and 133 miles west-northwest of Chicago. Steamboats can ascend the river to Galena, which is about 100 miles by water above Davenport, Iowa. The principal exports are lead (mined and smelted in the vicinity), zinc, dairy products, and grain. Population in 1890, 5,635.

GALERITES, a genus of fossil sea urchins, peculiar to and abundant in the Cretaceous system. The generic name, as well as that popularly given to them in the districts where they abound, viz., "Sugarloaves", is descriptive of the conical shape of their shell. The body in breadth is nearly circular or polygonal. The under surface is entirely flat, and has the mouth placed in its center, with the vent near the margin. There are five avenues of pores reaching from the mouth to the summit. The fossils are often found silicified.

GALES, JOSEPH (1760-1841), an American journalist. He published the "Register" in Sheffield, England, for several years, and in 1793 sold his journal and came to the United States. He then edited the Philadelphia "Independent Gazetteer," till 1799, when he removed to Raleigh, N. C., and founded the "Register," which he continued to publish until he reached an advanced age. He then became interested in African colonization, and was an active member of the American colonization society until his death.

GALES, JOSEPH (1786-1860), son of the preceding, also an American journalist. In 1807 he became connected with the Washington "National Intelligencer," and in 1810 succeeded to the sole proprietorship. In 1812 he formed a partnership with William Winston Seaton, and in 1813 the "Intelligencer," which had previously been a tri-weekly paper, became a daily. Mr. Gales continued his connections with this journal until his death.

GALESBURG, a city of Knox county, Ill., 53 miles west-northwest of Peoria, 164 miles west-southwest of Chicago, 43 miles east by north of Burlington, Iowa, and 99 miles northeast of Quincy. Galesburg is directly connected with all these cities by railroad. It is surrounded by fertile prairies, and is noted for its educational institutions. It has several foundries and machine shops, and manufactories of brooms, corn planters, carriages, etc. Population in 1890, 15,264. See *Britannica*, Vol. X, p. 24.

GALESVILLE, the county-seat of Trempealeau county, Wis., on Beaver Creek. It has a university, a flour mill, stove works, and a barrel factory.

GALIGNANI, JOHN ANTHONY (1796-1873), and WILLIAM (1798-1882), Parisian publishers, born in London, the former Oct. 13, 1796, the latter March 10, 1798. They published the "Messenger," and made it an important medium for advocating cordiality between England and France. They founded at Corbeil, near Paris, a hospital for distressed Englishmen; and in 1839 the Galignani Home, for decrepit members of the printing and bookselling trades, was opened at Neuilly. The elder died Dec. 30, 1873, and the younger Dec. 12, 1882.

GALLILEE, the name applied to a porch or chapel attached to a church, in which penitents stood, processions were formed, and corpses deposited for a time previous to interment. In some religious houses the galilee was the only part of the church accessible to women. A portion of the nave was sometimes marked off by a step, or by a line of blue marble, to mark the boundary to which women were limited.

GALION, a city of Crawford county, Ohio, 64 miles north of Columbus. It has railroad shops, foundries, and a population (1890) of 6,326.

GALLAGHER, WILLIAM DAVIS, an American poet and journalist, born in 1808. In 1830 he became editor of the Xenia, Ohio, "Backwoodsman," in 1831 of the Cincinnati "Mirror," in 1836 of the Cincinnati "Western Literary Journal and Monthly Review," in 1838 of the "Hesperian," a Monthly Miscellany of General Literature, and at the same time was manager of the Columbus, Ohio, "State Journal," and from 1839 to 1850 was connected with the Cincinnati "Gazette." In the latter year he became the confidential clerk of Thomas Corwin, Secretary of the United States Treasury, and during the civil war was again employed in the Treasury department. At the close of the war he retired to Louisville, and has since been a resident of that neighborhood. For a few years from 1854, Mr. Gallagher was an editor of the Louisville "Daily Courier." He published three volumes of poems under the name of Erato (1835-37), and also *Selections from the Poetical Literature of the West* (1841), and *Miami Woods; a Golden Wedding and Other Poems* (1881).

GALLAIT, LOUIS, a Belgian historical painter, born at Tournay in 1812, has become famous by pictures on subjects from the history of the Low Countries, such as "The Abdication of Charles V." (1841), "Alva viewing the dead bodies of Egmont and Horn" (1851), and "The Plague of Tournay" (1882), which last the Brussels Museum purchased for £4,800.

GALLA OX, or **SANGA**, a remarkable variety of ox inhabiting Abyssinia. The chief peculiarity of this animal is the extraordinary size of the horns, which rise from the forehead with an outward and then an inward curve, producing a figure of a lyre, and finally curve a little outward at the tip, to which they taper gradually.

GALLATIN, the county-seat of Daviess county, Mo., on Grand River. It is a railroad junction, and is 76 miles northeast of Kansas City. Pop., 1,489.

GALLATIN, the county-seat of Sumner county, Tenn., 26 miles northeast of Nashville, and three miles from Cumberland River. It contains cotton, woolen and carriage factories, flour mills, a foundry and an establishment for the manufacture of agricultural implements. Population, 2,078.

GALLATIN, MOUNT, a mountain of the National Park, Wyoming, 10,000 feet high. Gallatin River and the east fork of Madison River rise near its base.

GALLATIN RIVER rises in the National Park, flows northward through Montana, and, after a course of 125 miles, unites with the Jefferson to form the Missouri River.

GALLAUDET, EDWARD MINER, an American educator, son of Thomas H., born in 1837. In 1856 he became a teacher in the Hartford asylum for deaf-mutes, and in 1857 organized the Columbian institution for the deaf, dumb and blind at Washington, D. C., becoming its principal the same year. In 1864 he was made president of the National Deaf-mute College, and the following year professor of moral and political science. In 1880 he attended the international congress of instructors of deaf-mutes, held at Milan, Italy, and in 1883 was president of the convention of American instructors at Jacksonville, Ill. In 1886 he visited England on the invitation of the British government, and gave the royal commission on the education of the deaf, dumb, and blind information regarding the system pursued by the United States. He is the author of a popular *Manual of International Law* (1879).

GALLAUDET, THOMAS, an American clergyman, son of Thomas H., born in 1822. In 1850 he was ordained deacon of the Protestant Episcopal church, and the following year became priest. In 1852 he founded St. Ann's church for deaf-mutes in New York city. He has contributed to the *American Annals of the Deaf and Dumb*, and to other periodicals.

GALLAUDET, THOMAS HOPKINS (1787-1851), an American educator. He studied theology at Andover, and was licensed to preach in 1814, but, after studying the methods in use at the establishments in Europe for teaching the deaf and dumb, devoted himself to the education of that class in the United States. He founded the first American institution for deaf-mutes, at Hartford, Conn., and was its president from 1817 to 1830, when he resigned because of impaired health. In 1838 he became chaplain of the Connecticut insane asylum. Among his works are: *Sermons Preached to An English Congregation in Paris*; *Bible Stories for the Young*; *Child's Book of the Soul*; and *Youth's Book of Natural Theology*. He edited also *American Annals of the Deaf and Dumb*. See **DEAF AND DUMB**, *Britannica*, Vol. VII, p. 11.

GALLE, JOHANN GOTTFRIED, a German astronomer born at Pabsthaus in 1812. He studied at the Universities of Wittenberg and Berlin, and afterwards became a teacher at Guben and in Berlin. In 1835 he was made an assistant in the newly founded observatory in Berlin. Here he enjoyed the instruction of the celebrated astronomer Encke. At the end of 1839 Galle discovered three new comets, for which he was awarded the Lalande prize. On Sept. 23, 1846, Galle received a letter from the French astronomer Leverrier, requesting him to examine a certain part of the sky for an unknown planet, and that very evening he discovered the planet Neptune. This discovery marks an era in the history of astronomy. Galle continued to make further discoveries, and since 1851 he has been professor of astronomy and director of the observatory at Breslau. He has published a number of articles

on astronomy in several scientific journals, but especially in the "Astronomische Nachrichten."

GALLEASS, a sort of galley formerly used in the Mediterranean. The galleass was larger than an ordinary galley, carried generally three masts and about 20 guns, and was rowed by galley-slaves, sometimes as many as 300 being employed in rowing one vessel.

GALLENGA, ANTONIO CARLO, born at Parma, Italy, but of a noted Piedmontese family, November 4, 1810; educated at the university of that city, took part in the political outbreaks there in 1831; went to France, the United States, and other countries, and naturalized in England in 1849. He wrote for the *London Times*, and is the author of numerous historical works. From 1854 to 1864 he sat in the Piedmontese and Italian parliaments.

GALLEON, a large ship formerly used by the Spaniards to carry home the gold, silver, and other wealth contributed by the Mexicans and South American colonies. Galleons were armed, and had usually three or four decks, with bulwarks three or four feet thick, and stem and stern built up high like castles. They were large clumsy structures, and the easy prey of pirates and hostile navies.

GALLIFET, GASTON ALEXANDRE, MARQUIS DE, born at Paris, January 23, 1830; entered the French army in 1848; commanded a regiment in Africa, and became general of brigade in the army of the Rhine 1870-71. During the second siege of Paris he commanded a brigade of the Versailles troops and won unenviable notoriety by his merciless severity in dealing with the Communist prisoners. Notwithstanding this fact he was promoted to high command on the reorganization of the army under Gambetta. In 1875, having meantime won distinction in Africa, he was made a general of division. He is a commander of the Legion of Honor and ranks high as a cavalry officer.

GALLINGER, JACOB H., United States Senator from New Hampshire, a physician, born in Cornwall, Ont., March 28, 1837. He received an academic education; was a printer, and became a physician in 1858. In politics he was a Republican; he was a member of the State house of representatives in 1872 and 1873; a delegate to the New Hampshire Constitutional convention of 1876, a State Senator, 1878-80, being president of the Senate in 1879-80. He was surgeon-general of New Hampshire for two years. He received the honorary degree of A. M. from Dartmouth College. He was a representative in the 49th and 50th Congresses; in 1891 was elected by the New Hampshire legislature to the United States Senate to succeed Henry W. Blair.

GALL-INSECTS, those which deposit their eggs in the tissue of plants, and which live within abnormal growths or excrescences produced on plants either by the action of the tenant of the excrescence, or that of its parent. The most common gall-producers belong to two of the seven orders of true insects, *Hymenoptera* and *Diptera*. See *INSECTS*, *Britannica*, Vol. XIII, p. 148-52.

GALLIPOLIS, a city and county-seat of Gallia county, Ohio, on the Ohio River, midway between Cincinnati and Pittsburgh. It has a line of packet-boats between these cities. The city contains foundries, woolen mills, furniture factories, and planing-mills. Population 4,498.

GALLIOT, a Dutch vessel carrying a main and a mizzen-mast, and a large gaff-mainsail. Galliot of 400 to 500 tons burden were formerly used as bomb-vessels.

GALLITZIN, DEMETRIUS AUGUSTINE (1770-1841). a Russian nobleman, and an American missionary.

In 1796 he was ordained a priest of the Roman Catholic church, and after traveling through various States of the Union as a missionary he settled in Cambria county, Pa., and purchased a large tract of land to be given to Roman Catholic families. He named his colony Loretto, and through his efforts the wilderness in which he settled was transformed into a thrifty community.

GALLIVATS, large row-boats, formerly, and still to some degree, used in eastern waters. They rarely exceed seventy tons, carrying two masts with high triangular sails. The Malay pirates employ these swift but somewhat fragile vessels.

GALLOWAY, MULL OF, bold headland of precipitous rock, the southern extremity of the peninsula called the Rhinns of Galloway, in Wigtownshire, and the most southern point of Scotland. It is $1\frac{1}{4}$ mile long, and $\frac{1}{4}$ of a mile broad, and rises to a height of 210 feet at its eastern extremity, on which stands a lighthouse 60 feet high.

GALT, SIR ALEXANDER TILLOCH, a Canadian statesman, born in Chelsea, Sept. 6, 1817, and at an early age emigrated from England to Canada. In 1833 he became a clerk of the British and American Land Company, and from 1844 to 1856 was sole manager of the company's estates. In 1849 Mr. Galt was elected a member of the Canadian Parliament from Sherbrooke, and from 1853 continued to occupy the same position till 1872, when he resigned. In 1858-62, in 1864-66, in 1867, and in 1869, he was minister of finance. In 1875 he was appointed a commissioner for Great Britain under the Treaty of Washington of 1871, and more recently he acted as a member of the Halifax Fisheries Commission. From 1880 to 1883 he was High Commissioner for Canada in England; in 1881 was Delegate for Canada at the Paris International Monetary Conference, and in 1883 was a member of the Executive and General Committees of the International Fisheries Exhibition. He declined the honor of C.B. (Civil) in 1867, but in 1869 was created a K.C.M.G., and in 1878 was made a G.C.M.G. The degree of LL.D., was conferred upon him by Edinburgh University. He is the author of *Canada from 1849 to 1869*, and of several pamphlets.

GALT, SIR THOMAS, brother of the foregoing, was born in England in 1815; removed to Canada in 1828; and was called to the bar in 1845. In 1858 he became queen's counsel, in 1869 judge of the common pleas, and afterward chief justice. He was knighted in 1888.

GALTON, FRANCIS, F.R.S., explorer and author, born at Duddleston, England, in 1822, is a grandson of Erasmus Darwin. He was educated in Birmingham and London, and graduated from Trinity College, Cambridge, in 1844. In 1846 he traveled in North Africa, and in 1850 explored lands in South Africa; his published accounts of his experiences procuring him the gold medal of the Royal Geographical Society. Mr. Galton is author of *Meteorographica*, 1863, the first attempt to chart the progress of the elements of the weather, on a large scale, and through which the existence and theory of anti-cyclones was first established. In later years he has published the following works, bearing more or less directly on heredity and on the measurement of the various faculties:—*Hereditary Genius, its Laws and Consequences*, 1869; *English Men of Science; Their Nature and Nurture*, 1874; *Inquiries into Human Faculty and its Development*, 1883; *Natural Inheritance*, 1889; also several memoirs on anthropometric subjects and on new statistical processes applicable to anthropometry, including that of composite portraiture.

GAULT, **GALT**, or **GOLT**, a subdivision of the Cretaceous system, is a stiff, bluish-gray clay,

which here and there contains indurated nodules and septaria.

GALVA, a city of Henry county, Ill., 45 miles southeast of Rock Island, on the ridge dividing the Illinois and Mississippi River basin. It is located in a rich coal region. Population (1890), 2,409.

GALVESTON, a city and port of entry of Texas, on the south side of the entrance into Galveston Bay. It is the principal port and the largest city in the State, with a population in 1890 of 29,084. See Britannica, Vol. X, p. 53.

GAMBETTA, Léon, the great French Republican leader to whose efforts was greatly due the rehabilitation of France after the war of 1870-71, was born in Cahors, a small city of the south of France, April 3, 1838. His father was a small trader of Italian extraction, the family originally coming from Genoa. Young Gambetta obtained an ordinary education at a provincial school and college, and in 1858 went to Paris to study law. Baptized and confirmed in the Roman Catholic faith, he practically abandoned all church communion before reaching manhood and became a materialist and a persistent opponent of clericalism. His life in Paris during the years which immediately followed his admission to the bar was one of struggles and poverty. The Napoleonic system denied anything in the nature of advancement to liberal advocates or barristers, and Gambetta had already become known by his fiery denunciations of the sham Caesarism of "Napoleon le Petit." But in 1868 his opportunity came. In that year some of the radical Parisian journals opened a subscription for a monument to the memory of Baudin, the deputy who was murdered during the *coup d'état*. Gambetta appeared for the defense of the veteran Delécluze and against him were arrayed the best forensic talent the government could command. The fiery Southerner's speech in denunciation of the men and methods of December woke a responsive echo in the hearts of the people and proclaimed the moral rottenness of the Second Empire in all its shame.

In the following year Gambetta contested seats in the chamber at both Paris and Marseilles, and being elected at both chose to sit for Paris. In July, 1870, came the declaration of war against Germany, followed swiftly by tidings of repeated disasters from the front. The democratic leader sought vainly to elicit the truth from the ministry, which tried to delude the people with optimistic reports. Earlier than any of his associates he pressed upon the ministry the necessity of arming the national guard and of facing the crisis so rapidly approaching. On the morning of Sunday, September 4, 1870, the overwhelming news of the surrender at Sedan reached Paris, and the Napoleonic dynasty was swept away by the force of an indignant people. Gambetta entered the ministry, which was constituted at the Hôtel de Ville by popular acclamation. He was made minister of the interior in the provisional government, which became the government of the national defense.

His first act was to issue a call for the convocation of the National Assembly on September 8th, but meantime the Prussians were pressing toward Paris, and this could not be held. As the invading army drew its cordons around the city, cutting off the government from all communications with the armies still in the field, it became imperative that some member of the government must leave Paris. The only possible method of escape was by balloon, and early in October Gambetta thus left the city, reaching Tours in safety. As the representative of the government outside Paris he became practically the dictator of France. He formed the

nucleus of a government and issued a proclamation calling upon the people to rise and repel the invader. France responded heroically, and there is no parallel in history to the gigantic efforts made by Gambetta to organize the undisciplined patriotism of the country into an army. It looked for a few brief weeks as if the army of the Loire might have succeeded in stopping the Germans, but Bazaine's treasonable surrender of Metz blasted all hopes, and the raw levies of Faidherbe, Chanzy and d'Aurelles de Paladine melted away before the trained organization of the Germans. Even when starving Paris capitulated in January, 1871, the tireless organizer declared his intention of carrying on the war *d'outrance*, but his proclamation to this effect was nullified February 4th by his colleagues in the capital, and he resigned his position. Four days later ten departments elected him to the National Assembly, which met at Bordeaux to approve the terms of peace preliminarily arranged by Jules Favre. Gambetta chose to sit for the department of Bas-Rhin, but the surrender of Alsace to Germany left him without a seat. He resigned and retired to St. Sébastien, Spain, in order to avoid voting for the ratification of the treaty.

Meantime Paris fell into the hands of the commune, and had to be reconquered by the troops of M. Thiers. Gambetta was reelected to the assembly at the supplemental elections in July, but his little band of followers were in a hopeless minority, and royalism and clericalism dominated the representative chamber. Little by little Gambetta succeeded in reorganizing the scattered Republicans. In 1872 he made a tour through the south of France, which was one continued ovation. At Grenoble, in September of that year, he made a memorable speech in opposition to the policy of M. Thiers, and when that statesman was driven from power in May, 1873, Gambetta had once more become the leader of a united party, which he ultimately led to victory. At this period of his public career the fiery advocate, the organizer of the patriot army, developed new powers of self-restraint, and displayed a calmness and patience which, in the face of Orleanist plots and clerical schemes, safely led the country to the permanent adoption of a republican form of government.

In February, 1875, the assembly decreed the republican form of constitution, and Gambetta, on April 23d, made a great speech at Belleville, the Communist quarter of Paris, in which he defended and supported the new organic law. It soon became evident that Marshal MacMahon, who had succeeded M. Thiers as president of the republic, with a seven years' term allotted him, had gone over to the reactionary party. The years 1876 and 1877 were probably those of the greatest perils the Third Republic had known. DeBroglie was plotting for the return of the Orleanists; MacMahon was a royalist at heart, and the Ultramontanes and Bonapartists were ready for anything. Gambetta was president of the budget committee of the assembly, and thus controlled the purse-strings of the nation. The reactionary attempt of May 16, 1877, united the Republicans, and in October of that year their triumph at the polls was complete. In January, 1879, Gambetta, by his famous "soumettre ou démettre" (submit or resign) speech addressed to MacMahon, forced his resignation and M. Grévy became president for the first time.

Republican institutions had become incorporated in the law of the land, and the new chief of the state proved anxious to rule constitutionally. Gambetta, while actually holding the power in his own hands, declined to assume the responsibilities of office in 1880, and contented himself with the presi-

dency of the chamber. His great idea was the substitution of the *scrutin de liste*, or vote by departments, for the *scrutin d'arrondissement* or district voting, and until this end was reached he did not desire to take office. In August, 1880, he became president of the council, and, in November, 1881, he assumed the premiership. His ministry lasted but a few weeks, and was, in effect, wrecked by himself. He proposed a reform which would have necessitated a new election by a new body of electors, and to this the chamber would not listen. But in his partial retirement Gambetta retained his leadership of the great Republican party which he had built up and led to victory, and his return to power, either as prime minister or as president of the republic, seemed but a matter of a few months or the possibility of a day. At the height of his power the great popular tribune was stricken down. On November 27, 1882, it was reported that he had met with an accident while handling a revolver—on the last day of the year he died. The circumstances of his untimely taking-off were mysterious, but the generally accepted account refers his death to the hand of a woman. Gambetta was honored and France honored herself by a public funeral of unexampled pomp, and a magnificent colossal statue of him has been raised in Paris.

GARARENTES, the ancient name of a warlike people of the desert of Sahara, who were engaged in the caravan trade across the desert. Their descendants, if any exist, are known by other names.

GARCIA-CALDERON, FRANCISCO, born in Arequipa, Peru, in April, 1829; became professor of philosophy and mathematics in the university of his native city; was afterwards elected to the chamber, and became secretary of the treasury in 1868. He attempted to form a new government after the war with Chili and the fall of Lima, and was sent to Chili as a prisoner. In 1884 he was elected to the Senate and became president of that body.

GARCIN DE TASSY, JOSEPH HÉLIODORE SAGESSE VERTU, French orientalist, born at Marseilles, Jan. 20, 1794, died in Paris, Sept. 2, 1878. He studied oriental languages under Silvestre de Sacy, and was appointed professor in the Institute in 1838. He published *Mémoires sur les Particularités de la Religion Musulmans dans l'Inde* (1832); *Histoire de la Littérature Hindoue et Hindoustans* (1837); *La Poesie Philosophique et Religieuse chez les Persans* (1864); and *Rhetorique et Prosodie des Langues de l'Orient Musulman* (1873).

GARDANT: in heraldry, said of an animal which is represented full-faced, and looking forward.

GARDEN, ALEXANDER (1730-1791), an English naturalist. In 1752 he settled in Charleston, S. C., and began the practice of medicine. He subsequently became an eminent physician and botanist, and in 1754 accepted a professorship in King's (now Columbia) College. In 1773 he became a member of the Royal Society of London, and later was vice-president. He adhered to the royal cause in the Revolution, and went to England in 1783. His property in South Carolina was confiscated, but afterwards was restored to his son. He published numerous works on botanical and zoological subjects.

GARDEN CITY, a village of Queens county, N. Y., situated on Long Island about 18 miles east of New York city. It was founded by the late A. T. Stewart, and is now held by his estate in fee in its entirety. It is the seat of the Protestant Episcopal bishop of Long Island, and contains about 100 houses; the streets and avenues are wide, lighted by gas, and bordered by ornamental trees, and the whole property is supplied with abundance of pure

water. The hotel is surrounded by a park of 30 acres, beautifully laid out. The memorial cathedral of the Incarnation, Protestant Episcopal, is a fine example of Gothic architecture, and the Memorial School, St. Paul's, for boys, is the largest and most complete school institution in the country. There is also a female seminary. Each of the ecclesiastical buildings is surrounded by an extensive park of its own.

GARDEN GROVE, a village of Decatur county, Ia., situated on a branch of the Burlington and Missouri River Railroad, about 60 miles south of Des Moines. It has a good steam flouring-mill and excellent schools.

GARDINER, SAMUEL RAWSON, historian, was born at Ropley, in Hampshire, March 4, 1829, and educated at Winchester and at Christ Church, Oxford, taking a first-class in 1851. For some years he filled the chair of Modern History at King's College, London, but resigned it in 1885 to continue his History at Oxford on an All Souls' elective fellowship. In 1882 he was granted a Civil List pension of £150. The period to which he has devoted himself with a wonderful patience and thoroughness of study, and a remarkably candid and unbiased openness of mind to the documents and the evidence of the time itself, is that of the first two Stuart kings of England. His work he gave to the world in instalments, which he grouped together and republished (1883-84) in ten volumes.

GARDINER'S (or GARDNER'S) ISLAND, east of Long Island, belonging to Suffolk county, N. Y. Area, 3,300 acres. Its surface is undulating pasture land. Here treasures were dug up which were reputed to have been buried by Captain Kidd in 1699. There is a light-house at the northern end.

GARDNER, a village of Worcester county, Mass., and a flourishing manufacturing center. Great quantities of chairs are here made; 200 different varieties are manufactured, giving employment to 2,000 men. Population (1890), 8,424.

GARFIELD, JAMES ABRAM (1831-81), the twentieth President of the United States, born in Orange township, Cuyahoga county, Ohio, Nov. 19, 1831. As a boy he had few advantages, and received a common school education only. He then worked early and late at various occupations until he accumulated sufficient money to put him through college. He entered Williams in the fall of 1854, and two years later graduated with one of the highest honors of his class. Returning to Ohio, he became teacher of the classical languages at Hiram, and in the following year was made, at the age of twenty-six, its president. He then studied and practiced law, and was a member of the Ohio Senate in 1859-60. In 1861 he entered the army as colonel of the 42d Ohio volunteers, and served in South-eastern Kentucky. In 1862 he was promoted brigadier-general of volunteers, and served at Shiloh and Corinth. In 1863 he was appointed chief of staff by Gen. Rosecrans, and for gallantry at the battle of Chickamauga was promoted major-general of volunteers. He resigned shortly afterwards to occupy a seat in the 38th Congress, to which he had been elected. Throughout his public life he was a consistent advocate of a sound currency, and financial heresies of all kinds found in him a sturdy opponent. He was chairman of the committee on banking and currency in the forty-first and of the committee on appropriations in the forty-second and forty-third congresses, while in the three succeeding (Democratic) congresses his thorough knowledge of finance secured him a place on the ways and means committee. He opposed Andrew Johnson and acted throughout with the Union party in Congress. In 1876 he visited Louis-

ians to watch the counting of the electoral vote, and, although he had opposed the creation of the electoral commission, he became one of the Republican representatives in that body. On January 13, 1880, while still a member of Congress, Mr. Garfield was elected United States senator by the legislature of Ohio. At the Republican Convention held in Chicago in June, 1880, he received the nomination for President of the United States, and was elected, November 2, over his competitor, Gen. Winfield Scott Hancock, by the votes of every Northern State except New Jersey, Nevada and California, the electoral votes standing: For Gen. Garfield, 215; for Gen. Hancock, 155. On July 2, 1881, four months after his inauguration, he was shot in the depot of the Baltimore and Potomac Railroad in Washington, by Charles Jules Guiteau, a disappointed office-seeker. He lingered, suffering great pain, till September 19 of the same year, when he died at Elberon, N. J., to which place he had been removed in the hope of prolonging his life. His remains were removed to Washington, and funeral services were held in the rotunda of the Capitol. On September 26 the burial services were held at Cleveland, Ohio, and the casket was deposited in the tomb prepared for it.

GARIBALDI, GIUSEPPE (1807-82), Italian patriot, was born at Nice, in Sardinia, Italy, his father being the owner of a trading vessel and engaged in maritime pursuits. Becoming a sailor, and in 1830 a commander of a brig, he visited various Italian ports, formed the acquaintance of Mazzini and the leaders of the Italian liberal movement, and in 1834 was involved in the Young Italy movement. He was condemned to death for taking part in an attempt to seize Genoa, but escaped to South America, where he distinguished himself as a guerilla warrior and privateer in aid of the province of Rio Grande, in rebellion against the Emperor of Brazil, and where he eloped with and married Anita Riveira de Silva. In aid of the Montevideans against Rosas, the tyrant of Buenos Ayres, he won fresh renown on sea and land in 1846, and the "red shirt" of Garibaldi became famous. When, in 1847, Pope Pius IX. ascended the throne, Garibaldi tendered his services in his support, but they were not accepted; and when the Pope appeared to desert the national cause, Garibaldi threw in his lot with the revolutionary government of Rome, from which place he fled before the French and Austrians. After enduring great hardships, which his wife shared until her death from exhaustion, he succeeded in escaping to America, and for eighteen months was engaged in the business of candle-making on Staten Island, in New York harbor, and, returning to a sea-faring life, became captain of various merchantmen. In 1854 he returned to Italy, and settled down as a farmer on the island of Caprera, but in 1859 resumed arms once more, placing his sword at the disposal of Victor Emanuel, and rendering valuable services to the allies. When Victor Emanuel was elected sovereign of the Two Sicilies, Garibaldi again retired to Caprera, indignant that he had not been permitted to march on Rome, and that his veteran volunteers were not enrolled in the regular army. In 1862 he embarked on a rash expedition against Rome, and was wounded and taken prisoner at Aspromonte, being detained two months at Spezia. In the war of 1866 Garibaldi, with his two sons, was engaged and arrested by the Italian government for another rash attempt on Rome; he was once more allowed to retire to Caprera, where he wrote two novels, one of which has been translated, the *Rule of the Monk*. In 1870 he came to the assistance of the French Republic, being

placed by Gambetta in command of the volunteers of the Vosges, who distinguished themselves at Dijon in January, 1871, and he was elected to the assembly at Bordeaux.

During the remainder of his life he remained a helpless invalid, rarely leaving Caprera, of which his English friends made him entire proprietor. In 1874 he was made a member of the chamber of deputies at Rome, and took his seat. In 1880 his marriage with an adventuress in 1859 was annulled, and he married Francesca, his peasant companion, who had come to the island as nurse to the children of Teresa, his daughter, the wife of one of his officers. Garibaldi died June 2, 1882.

See *Britannica*, Vol. XIII, pp. 487-91 for an extended account of the assistance rendered by Garibaldi to the cause of Italian unity. His autobiography was published in 1887, and an English translation in 1889.

GARIGLIANO, a river of Southern Italy, rising in the Abruzzi, west of the former Lake of Fucino, and flowing after a generally southerly course of 90 miles, into the Gulf of Gaeta. It is navigable below Pontecorvo.

GARLAND, AUGUSTUS HILL, an American statesman, born in 1832. He was admitted to the Arkansas bar in 1853, and in 1861 was a member of the Provisional Congress that met in Montgomery, Ala. He was a member of the First Confederate Congress, and at the close of the civil war was a Confederate Senator. In 1867 he was elected to the U. S. Senate, but was not allowed to take his seat. In 1874 he was elected governor of Arkansas, and in 1876 was sent to the U. S. Senate. He served as Senator from 1877 to 1885, when President Cleveland appointed him Attorney-General of the United States. Mr. Garland's term of office expired with Mr. Cleveland's retirement from the Presidency.

GARLASCO, a town of Italy, in the province of Pavia, 23 miles southeast of Novara. It contains monuments of the mediæval period. Population, 6,500.

GARNEAU, FRANÇOIS XAVIER (1809-66), a Canadian historian. He was admitted as a notary in 1830. Subsequently he was clerk of the legislative assembly, member of the council of public instruction, and from 1845 till his death, city clerk of Quebec. He is the author of *Histoire du Canada, depuis sa Découverte jusqu'à nos Jours* (1852); and *Voyage en Angleterre et en France dans les Années 1831-33*.

GARNET, HENRY HIGHLAND (1815-82), an American negro clergyman, born in slavery. He taught school in Troy, N. Y., was licensed to preach in 1842, and then was pastor of a Presbyterian church in Troy for nearly 10 years. In 1850-53 he lectured on slavery in Europe, and then went to Jamaica as a missionary for the United Presbyterian church of Scotland, but returned to the United States on account of failing health. In 1855 he became pastor of Shiloh Presbyterian church in New York city, and in 1865 accepted a call to a church in Washington, D. C. In 1869 he was chosen president of Avery College, but resigned soon afterward and returned to Shiloh church. In 1881 President Garfield appointed him minister and consul-general to Liberia, and in November he sailed for Africa. A few months after his arrival he succumbed to the climate.

GARNETT, a city and county-seat of Anderson county, Kan., on the Pottawattomie River. Cheese and furniture are made here, and the city contains a college, which is under United Presbyterian control. Pop. (1890), 2,191.

GARNETT, RICHARD, an English author, born at Lichfield in 1835. His father, the Rev. Richard

Garnett, was an eminent author and philologist and one of the librarians of the British Museum. The younger Garnett was appointed assistant keeper of that great library when his father died, in 1850. In 1875 he became superintendent of the reading-room.

GARNIER, FRANCIS, sailor and traveler, was born at St. Etienne, July 25, 1839, and entering the navy fought in the Chinese war (1860-62). Appointed to a post in French Cochinchina, he promoted a great exploring expedition, of which he ultimately assumed the command. Starting from the coast of Cambodia, the expedition traveled to Shanghai by way of Yunnan. He took part in the defense of Paris in 1870-71, and subsequently traveled again in China. In the Tonkin war he took Hanoi, but was killed December 2, 1873. His chief work is *Voyage d'Exploration en Indo-Chine*.

GARNIER, JEAN LOUIS CHARLES, a French architect, born at Paris, Nov. 6, 1825. He gained the grand prize at the École des Beaux-Arts in 1842, and subsequently continued his studies in Greece and Italy. His plans were adopted for the new Paris opera house, which was completed under his direction in 1875. He also built the San Carlos theater in Monaco.

GARNIER-PAGÈS, LOUIS ANTOINE, a French author and statesman, born at Marseilles in 1803, died in 1878. He was a Republican. In 1830 he took part in the revolution at Paris, and was afterwards elected to the chamber of deputies. In the provisional government of 1848 he was minister of finance. But he was soon forced to retire into private life, because he insisted on an extra taxation in order to save the state from bankruptcy. In 1869 he was again elected to the Corps Legislatif. When the Germans besieged Paris he took part in the defense of the city. Among his writings are: *Histoire de la Révolution de 1848*, and *Histoire de la Commission Exécutive* (1869).

GAR-PIKE (*Belone*), a genus of bony fishes in the family scombrosocidae, not far from the true pikes (esocidae). They have long bodies, and both jaws are prolonged into a slender beak, beset with roughnesses and widely set teeth. They swim actively, with an undulating motion, near the surface, and catch small fishes in their jaws. The common gar-pike (*B. vulgaris* or *B. belone*) is frequent off British coasts, and is sometimes called greenbone, from the color of the bones (especially after cooking), gorebill, from its characteristic beak, or mackerel-guide, because it visits the coasts just before the mackerel. About fifty species are known from tropical and temperate seas, some twice as long as the British species.

GARRAUD, GABRIEL JOSEPH, French sculptor, born at Dijon, March 23, 1807; studied under Ramey and Rude, and first exhibited in the Salon of 1838. Among his works are *La Première Famille* (1845); *Le Secret de l'Amour* (1863), and many busts. He was chief of the Department des Beaux-Arts for a short time in 1848.

GARRETSON, JAMES EDMUND, an American physician and author, born in 1828. He graduated in medicine at the University of Pennsylvania in 1859, and began practice in Philadelphia. In 1861-63 he lectured in the Philadelphia School of Anatomy, and in 1866-69 in the University of Pennsylvania. Since 1879 he has been dean of the Philadelphia Dental College.

GARRETSVILLE, a village of Portage county, Ohio, on a division of the Atlantic and Great Western Railroad, 37 miles southeast of Cleveland. It has machine shops and various manufactures.

GARROT, a name sometimes given to a sea-duck of the genus *Clangula*, family *Anatidae*, of which

there are several species. The common garrot, *Anas* or *Fuligula clangula*, is also called *golden-eye*.

GARROTTE, a mode of execution practiced in Spain and the Spanish colonies. Originally it consisted in simply placing a cord around the neck of the criminal, who was seated on a chair fixed to a post, and then twisting the cord by means of a stick inserted between the post and the back of the neck, till strangulation was produced. Afterwards a brass collar was used, containing a screw, which the executioner turned till its point entered the spinal marrow where it unites with the brain, causing instantaneous death. In its primitive form it exactly resembles the punishment of the bowstring in use among Mohammedan nations.

GARROVILLAS DE ALCONETAR, a small town of Spain in the province of Cáceres, situated 20 miles northwest of the town of that name, on the left bank of the Tagus. It has manufactories of linen and woolen fabrics, and some trade in grain, cattle and fruit.

GAS, ILLUMINATING. See Britannica, Vol. X, pp. 87-102.

GASCONADE, a river of Missouri, winding 200 miles northeastward through a hilly and picturesque country, till it joins the Missouri River, 35 miles below Jefferson City.

GASPARIN, AGÉNOR ÉTIENNE, COMTE DE (1810-71), a French author and publicist, born at Orange in 1810. His father, Comte Adrien E. P., was in 1836 secretary of the interior, and Agénor at that time was employed under his father. In 1842 he was elected to the chamber of deputies. Although a member of the nobility of France, Count Gasparin favored many liberal measures, being moved thereto by his Protestant principles. During the revolution of 1848 he was in the East. He did not favor the empire established by Napoleon III. For this reason he removed to Switzerland, and lectured at Geneva on social, religious and historical subjects. As he was an enemy to slavery he expressed the warmest friendship for the cause of the Union during our late civil war, and published two works in its behalf: *Les États-Unis* in 1861; *Un Grand Peuple que se Relève* (1861); and *L'Amérique devant l'Europe* (1862). These were translated and published in New York as the *Uprising of a Great People*, and *America Before Europe*. Comte Gasparin also published several works on French Protestantism, Spiritualism, the family, moral liberty, and the *Life of Innocent III* (1874). His philanthropic labors in behalf of French refugees who flocked to Geneva hastened his death, which occurred May 14, 1871.

GASPÉ, a peninsula in the east of Quebec province, Canada, comprising the counties of Gaspé and Bonaventure, projects into the Gulf of St. Lawrence, between the estuary of that name on the north and the Bay of Chaleurs on the south. It has an area of nearly 8,000 square miles, and 34,652 inhabitants.

GASPÉ BASIN, a port of entry in Gaspé Bay. It is the seat of extensive fisheries, and is distinguished in history as being the place where Jacques Cartier landed in 1554. Population, 726.

GASTINEAU, BENJAMIN, a French writer, born at Montreuil-Bellay, in the department of Maine-et-Loire, July 12, 1823. He began to contribute to Socialist papers in 1844, entered into politics, and in 1852 was banished to Algeria. Receiving permission to return to France in 1856, he devoted himself to literature until 1870. In 1872 he was imprisoned for taking part in the insurrection of the Commune. Among his works are: *Lutte du Catholicisme et de la Philosophie* (1844); *La Guerre des Jésuites* (1845); *Le Règne de Satan, ou les Riches et les*

Pauvres (1848); *Les Victimes d'Isabelle II* (1868); and *L'Imperatrice du Bas-Empire* (1870).

GASTON, WILLIAM (1778-1844), an American jurist. He was admitted to the North Carolina bar in 1798; in 1799 was chosen to the State Senate; in 1808 to the house of delegates; and from 1813 to 1815 was a member of Congress. He was judge of the North Carolina Supreme Court from 1834 till his death, and in 1835 was prominent in revising the State constitution. In 1840 he declined the United States senatorship.

GATES, MERRILL EDWARDS, born in Warsaw, N.Y., April 6, 1848; became president of Rutgers College, N. J., in 1882, and in 1884 a member of the Board of Indian Commissioners. Later Mr. Gates accepted the presidency of Amherst College.

GATES, SIR THOMAS, governor of Virginia, was born late in the seventeenth century. His name first appears when the second charter of Virginia was given to a company on May 23, 1609. The officers therein named were West, de la Warr, Somers, Newport, Dale, Wainman and Sir Thomas Gates as lieutenant-general. The colonization of Virginia thereafter became greatly stimulated, and money was contributed in aid of the purpose, and nine vessels with nearly 600 emigrants left Europe for America, under Newport, Somers and Gates. They sailed in May, 1609. Only seven ships reached Virginia; one with its passengers was lost at sea; the other, that conveyed Gates, was stranded at one of the Bermuda Islands. Here Gates and his companions improvised two small vessels in the course of nine months, and set sail for their original destination, which they reached on May 24, 1610. They found the Virginia colony in a condition of anarchy and neglect, and its numbers reduced by sickness and famine to about fifty individuals. Gates and the colonists then decided to abandon the settlement and sail coastwise for Newfoundland in four remaining pinnaces that still floated on the river, and seek a passage to England. But no sooner had they begun their voyage than they encountered Lord de la Warr, who, ascending the river on June 9, 1610, with new colonists and fresh supplies, persuaded Gates and his party to return to Jamestown. Lord de la Warr had promised to send to the council an early report of the condition of the colony, and for this purpose dispatched Sir Thomas Gates to England. Sir Thomas, with great energy, gathered means and recruits; in August, 1611, he reached Jamestown safely with six vessels and about 300 colonists. He assumed the functions of governor, established divine worship, law and order, and in 1611 made new settlements in Henrico. In March, 1612, a third patent was granted to the company by the crown, that for the time being gave them control of the Bermuda Islands and all other islands within 300 leagues from the Virginia shore. Sir Thomas Gates returned to England in 1614 in the interest of the Colonists. Of his subsequent history we have no record.

GATINEAU, a river of Quebec, in Canada, which has its origin in a chain of lakes lying immediately north of 48° N. latitude, and, after a south-south-western course of 400 miles, enters the Ottawa River a mile below Ottawa City.

GATLING, RICHARD JORDAN, an American inventor, born in 1818. At the age of 20 he invented a screw for propelling steamers, and later a machine for sowing rice and wheat. In 1850 he invented a hemp brake; in 1857 a steam plow; and then a machine for transmitting power by means of compressed air. His fame is based, however, upon his invention of the revolving battery which bears his name. It consists of a number of breech-loading rifled barrels, made to revolve around a

common center and fed with cartridges by a hopper. The new gun with ten barrels is capable of firing 1,200 shots per minute. In 1866 it was adopted into the United States service. It has also been adopted by several European governments. More recently he has invented an improved method of casting large cannon of steel, and also a torpedo and gunboat, and a pneumatic gun for discharging high explosives, which has recently been subjected to severe tests.

GAULEY MOUNTAINS, a range of the Appalachian system in West Virginia, continuous with the ridge known farther southwest as the Cumberland Mountains.

GAULEY RIVER, West Virginia, rises in Pocahontas county, flows nearly southeastward, and falls into the great Kanawha. It is about 120 miles in length.

GAVAZZI, ALEXANDRO, a popular Italian preacher and reformer, born at Bologna in 1809, died in 1889. When 16 years old he became a monk of the Barnabite order. Soon afterwards he was appointed professor of rhetoric at Naples, where he speedily acquired a reputation as an orator. He illustrated the theory of his art by eloquent addresses in the pulpits of the chief Italian cities. On the accession of Pius IX to the papal chair, Gavazzi was one of the foremost supporters of the liberal policy which inaugurated that pontiff's reign. Having repaired to Rome, he devoted himself to the diffusion of political enlightenment and patriotic aspirations among the masses of the Roman population. Pius IX sanctioned his political labors, and appointed him almoner of a body of about 16,000 Roman troops. Gavazzi's fervid speeches brought him the title of "Peter the Hermit" of the national crusade. On the establishment of the Roman Republic, he was appointed almoner-in-chief to the national army. Under his superintendence efficient military hospitals were organized and attended by a band of Roman ladies, who volunteered their services and cooperation in the care of the wounded. After the fall of the Holy City in 1849, he left Italy, an exile, and went to England, where he delivered numerous addresses and lectures, illustrative of the political and religious aims of his country. Afterwards he visited the United States, where he lectured with brilliant success. In 1860 Father Gavazzi was present with Garibaldi during the expedition to Palermo. He was the president of the evangelization committee of the Free Italian church.

GAVI, a town of Italy, in the province of Alessandria, 5 miles south of Novi. It is of ancient origin, and is still surrounded by mediæval fortifications. Population, 6,304.

GAUVILAN MOUNTAINS, a branch of the Coast Range in California, extending through the counties of San Mateo and Santa Cruz. The highest point is Mt. Pacheco, 2,845 feet high.

GAVOTTE, a French dance of a lively yet dignified character. The music is in common time, moderately quick, and always begins on the third beat of the bar; each of the two sections of which it consists is usually repeated.

GAY, EBENEZER (1696-1787), an American Unitarian clergyman. In 1718 he became pastor of the church at Hingham, Mass., where he remained till his death, preaching in the same pulpit within three months of seventy years. He published many sermons.

GAY, SIDNEY HOWARD, an American author, born in 1814. In 1842 he became a lecturing agent for the American anti-slavery society, and from 1844 to 1857 was editor of the New York "Anti-Slavery Standard." He then became connected with the

"Tribune," and from 1862 to 1866 was managing editor. From 1867 to 1871 he was editor of the Chicago "Tribune," and from 1872 to 1874 was on the editorial staff of the New York "Evening Post." He was an ardent Abolitionist; wrote a *History of the United States* in connection with William Cullen Bryant, and was the author of a life of James Madison. He died June 25, 1888.

GAY, WINCKWORTH ALLAN, an American artist, born in 1821. He studied in Italy and France, and traveled in Egypt, China and Japan. Among his pictures exhibited at the National Academy in New York are: *Mackerel Fleet; Beverly Coast, Mass.* (1869); and *The Doge's Palace, Venice* (1875). His *Windmills of Delfshaven, Holland*, was at the Centennial Exhibition at Philadelphia in 1876.

GAYARRÉ, CHARLES ÉTIENNE ARTHUR, an American historian, born in 1805. He was admitted to the bar in 1829; was elected to the Louisiana legislature in 1830; appointed deputy attorney-general of the State in 1831, and in 1833 presiding judge of the New Orleans city court. In 1835 he was elected to the United States Senate, but impaired health prevented his taking his seat. In 1844 he again became a member of the State legislature, and was reelected in 1846. The same year he was appointed secretary of State, and again in 1850, retaining the office till 1857. Since the civil war he has been reporter of the State Supreme Court. He is the author of many historical works.

GAYARRE, JULIAN, the great Spanish tenor, born in Navarre in 1850, died in Madrid in 1890. His voice early attracted the attention of Professor Eslava, who took him to Madrid. His career was most successful. The leading European cities lauded him as the greatest tenor of his age, and many thought him the equal of Mario. Though lacking somewhat in dramatic talent, he had true musical sensibility and was able to interpret Wagner as well as those less dramatic.

GAY-HEAD, a post-township of Dukes county, Mass., a promontory forming the western portion of the Island of Martha's Vineyard. Its rocks abound with Miocene fossils. The inhabitants are chiefly Indians, who live by farming and fishing. Here is a revolving light raised 170 feet above the sea.

GAYLORD, the capital of Otsego county, Mich., on the Mackinaw division of the Michigan Central Railroad.

GEAR, JOHN HENRY, born in New York State in 1825; removed to Iowa, and in 1843 engaged in business at Burlington, of which city he was mayor in 1863. He was three times elected to the State general assembly, and served two terms as speaker of the house. In 1878-79, and again in 1880-81, he was governor of the State, and was elected to the fiftieth and fifty-first Congresses by the first Iowa district as a Republican. In 1892 he was elected to the fifty-third Congress.

GEARY, JOHN WHITE (1817-73), an American soldier. He studied engineering and law, and was admitted to the bar, but never practiced. In 1846 he was lieutenant-colonel of the 2d regiment of Pennsylvania, and for services rendered in the field was made first commander of the city of Mexico, and colonel of his regiment. In 1849 he was appointed first postmaster of San Francisco, and in 1850 was made mayor of that city. In 1856 he was appointed territorial governor of Kansas, and held the office one year. At the beginning of the civil war he raised the 28th Pennsylvania volunteers, and during the war commanded in several engagements. He several times won distinction, and attained the rank by brevet of major-general. In 1866 he became governor of Pennsylvania, and held the office to within two weeks of his death.

GEARY, THOMAS J., of Santa Rosa, was born in Boston, Mass., January 18, 1854; removed with his parents to California in April, 1863; studied law, and was admitted to the bar in 1877, and has been engaged in the practice of his profession since; was elected district attorney of Sonoma county in 1882, and served two years; was elected as a Democrat and American to the fifty-first and the fifty-second Congress, and was reelected to the fifty-third Congress.

GEFFRARD, FABRE (1806-79), a president of Hayti. In 1821 he enlisted as a private soldier in the Haytian army, and rose by successive promotions to a captaincy. In 1843 General Herard Rivière appointed Geffrard lieutenant-colonel, and he was soon afterward appointed colonel. In 1844 he became brigadier-general and commander of Jacmel. In 1845 he was appointed general of division, and in 1850 was created Duke of Tabaro. In 1859 he headed a revolt against Souloque's government, and became president of Hayti. In 1867 his government became unpopular, and there was a revolt under Salnave. Geffrard, seeing that resistance was useless, took refuge on board a French vessel and went to Jamaica, where he died.

GEHENNA, the Greek form of the Hebrew *Gehinnom*, or Valley of Hinnom. This valley, or rather narrow gorge, lies south and west of the city of Jerusalem. Here Solomon built a high place for Moloch (1 Kings, xi. 7), and indeed Gehenna seems to have become a favorite spot with the later Jewish kings for the celebration of idolatrous rites. It was here that Ahaz and Manasseh made their children pass through the fire "according to the abomination of the heathen;" and at its southeast extremity, specifically designated Tophet ("place of burning"), the hideous practice of infant sacrifice to the fire-gods was not unknown (Jeremiah, vii. 31). When King Josiah came forward as the restorer of the old and pure national faith he "defiled" the Valley of Hinnom by covering it with human bones, and after this it appears to have become "the common cesspool of the city, into which its sewage was conducted, to be carried off by the waters of the Kidron, as well as a lay-stall, where all its solid filth was collected. Hence, it became a huge nest of insects, whose larvae or 'worms' fattened on the corruption." It is also said that fires were kept constantly burning here to consume the bodies of criminals, the carcasses of animals, and whatever other offal might be combustible. Among the later Jews *Gehenna* and *Tophet* came to be symbols for hell and torment, and in this sense the former word is frequently employed by Jesus in the New Testament—e. g. Mark, ix. 47, 48.

GEIKIE, ARCHIBALD, a Scotch geologist, born at Edinburgh in 1835. He studied at the high school and University of his native city, and was in 1855 appointed a geologist in the national survey of Scotland. In 1867 he was made director of the survey, and in 1870 he was appointed professor of mineralogy and geology in the University of Edinburgh.

GEIKIE, CUNNINGHAM, a Scottish clergyman, born in Edinburgh in 1826. After his education at the high school and University of Edinburgh was finished, he followed his father to Canada, became pastor of a church near Toronto, and was subsequently called to a pastorate in Halifax. In 1862 he returned to England, and there accepted a pastorate in Sunderland. In 1876 he took orders in the Church of England, and has since his ordination held a rectorship at Paris, France, and at Barnstable, Eng. Geikie is a prominent "Low Church" leader.

GEIKIE, JAMES, a Scottish geologist, brother of Archibald, born in Edinburgh in 1839. He was educated at the high school and University of Edinburgh. In 1861 he joined the geological survey, in which service he rose to be district surveyor or local director of the survey in Scotland. He resigned this position on his appointment, in 1882, to the Murchison chair of geology and mineralogy in Edinburgh University, which he now occupies. Professor Geikie has written many important scientific papers. Among these are: *The Great Ice Age and Its Relations to the Antiquity of Man* (1874); and *Prehistoric Europe* (1881), a work treating of archæology as well as Pleistocene geology.

GELIDIUM, a species of sea-weed said to be utilized in the building of the edible birds'-nests, so much prized by the Chinese. These and allied species are largely used for food in the East, as yielding wholesome jellies.

GEMBLoux, or GEMBLours, a town of Belgium, province of Namur, celebrated as the scene of the victory of Don John of Austria over the United Netherlands in 1578. A state agricultural establishment is located here. Population, about 3,000.

GENDER, a grammatical distinction between words corresponding directly or metaphorically to the natural distinction of sex. Names applied to the male sex are said to be of the *masculine* gender; those applied to the female sex, *feminine*; while words that are neither masculine nor feminine are said to be of the *neuter* gender. In modern English we have no such thing as merely grammatical gender, save when sex is attributed metaphorically to inanimate things by such a figure of speech as personification; but in old English, as well as in Sanskrit, Greek, and Latin, inanimate things are generally either masculine or feminine; and this distinction of gender is marked by the terminations of the case-endings. In Hebrew there is no neuter, all names being either masculine nor feminine, as also in the modern Romance tongues, Italian, French, Spanish, and Portuguese. German, in matter of gender, resembles old English and the classical tongues.

GENERAL, an officer of the general staff of the army. A general commanding-in-chief would, in the field, usually command several army corps; a general, one corps; a lieutenant-general, one division; and a major-general, one brigade. The general's yearly pay is \$13,500; the lieutenant-general's is \$11,000; the major-general's, \$7,500; and the brigadier-general's, \$5,500. The rank of general was created by Congress in 1866, and bestowed on General Grant, afterwards being conferred on Sherman and Sheridan. With the death of W. T. Sherman in 1891 it became extinct. The rank held by Washington was that of lieutenant-general.

GENERAL CONVENTION, THE, a body consisting of bishops, clerical and lay delegates from each Protestant Episcopal diocese of the United States, convened every three years, and by its constitution having power to form new dioceses, to try bishops, and to establish and revise a Prayer Book. This body was organized in 1785, with a view to a closer union of the churches in the different States. It has gradually become the governing body of the church, its acts extending to all points of discipline and doctrine.

GENERALIZATION, the act of comprehending under a general name a number of objects which agree in one or more points. The result of generalization is a common name or general term which stands for the many objects in so far only as they all agree. In logic the genus is a higher class which includes a lower, the lower one being the

species; but the distinction is relative. That which is a genus in relation to its species is itself a species in regard to a higher genus.

GENERATIONS, ALTERNATION OF, an interesting complication in the life-history of many plants and animals, the organism producing offspring which are unlike itself, but which in turn gives rise to forms like the original parents. See REPRODUCTION, *Britannica*, Vol. XX, pp. 429-31.

GENESSEE RIVER rises in Potter county, Pa., flows northward through New York, and enters Lake Ontario. It is about 120 miles in length, is navigable for lake vessels for five miles, has falls at Rochester and Portageville, and its valley is a beautiful and fertile region.

GENESE, a city of Henry county, Ill., 23 miles east of Rock Island on the Mississippi River. It is a shipping point for stock and grain, and an enterprising manufacturing town. Among the articles produced are wagons, furniture, tubs, pails, flour, and agricultural implements. Pop., 3,182.

GENESE, the county-seat of Livingston county, N. Y., on the Genesee River. It has a State normal school, public library, water-works, and gas. Population, 2,286.

GENEST, EDMOND CHARLES (1765-1884), a French diplomatist. In 1789 he was sent to St. Petersburg as *chargé d'affaires*, and in 1792 was appointed minister to the United States. He was cordially welcomed by the American people; but, when he denounced the American government for remaining neutral in the troubles between France and England, and went so far as to issue commissions to privateers, ordering that their prizes should be tried and condemned by French consuls in the United States, Washington demanded and obtained his recall. Genest decided not to return to France, and was naturalized and settled in the State of New York. During his remaining years he took great interest in promoting improvements in agriculture and in the arts and sciences.

GENEVA, the capital of Geneva county, Ala., situated on the Choctawhatchee River. It has a lumber mill.

GENEVA, the county-seat of Kane county, Ill., on Fox River, 35 miles west of Chicago. It has excellent water-power, which is utilized in glucose and other factories. It has a foundry and expensive school buildings. Population, 1,692.

GENEVA, a village of Franklin county, Iowa, situated on the Central Railroad, 9 miles northwest of Ackley, and 7 miles southeast of Hampton, the capital of the county.

GENEVA, the capital of Fillmore county, Neb., 60 miles west-southwest of Lincoln. Pop., 1,580.

GENEVA, a town of Ontario county, N. Y., at the north end of Seneca Lake, about 16 miles east of Canandaigua. By rail it is 26 miles west of Auburn, and 50 miles east-southeast of Rochester. It is situated on high ground, and is the seat of Hobart College. Steamboats ply daily between Geneva and Watkins, which is about 36 miles distant. It has optical works, bending works, and manufactories of engines, boilers, and steam-heating apparatus. Population, 17,557.

GENEVA, a village of Ashtabula county, Ohio, 45 miles northeast of Cleveland. It contains a normal school, and manufactories of agricultural tools. Population (1890), 1,194.

GENEVA, a village of Walworth county, Wis., on Geneva Lake. It has a ladies' seminary and flouring-mill. Population, about 2,000.

GENII, among the ancient Romans, were protecting spirits, who were supposed to accompany every created thing from its origin to its final decay, like a second spiritual self. They belonged

not only to men, but to all things, animate and inanimate, and more especially to places. The genius of an individual was represented by the Romans as a figure in a toga, having the head veiled, and the cornucopia or patera in the hands; while local genii appear under the figure of serpents eating fruit set before them. See *DEMONOLOGY*, *Britannica*, Vol. VII, pp. 60-64; *MANES*, Vol. XV, pp. 477-78; and *PENATES*, Vol. XVIII, pp. 488-89.

GENOA (DUKE OF), THOMAS ALBERT VICTOR DE SAVOY, nephew of King Victor Emmanuel, was born Feb. 6, 1854. After receiving an English education at Harrow School, he went through a regular course of study in the Marine College at Genoa, and came out an officer of the Royal Italian Navy, in which capacity he was entrusted with the command of the *Vettor Pisani*, a corvette of the first rank, bound on a voyage round the world. The vessel completed her cruise in 1880, and the Duke's journal of the voyage was published at the close of that year.

GENOA, GULF OF, a large indentation in the northern shore of the Mediterranean north of Corsica. It has, between the towns of Oneglia on the west and Spezzia on the east, a width of nearly 90 miles, with a depth of about 30 miles.

GENOA, a village of Ottawa county, Ohio, 13 miles southeast of Toledo. It has lime-stone quarries and lumber mills. Its manufactures are washboards, wooden bowls, stoves, barrels and hoops. It has a German school and graded schools.

GENRE-PAINTING, a term in art which was originally used to indicate simply any class or kind of painting, and was always accompanied by a distinctive adjective. It has now, however, come to be applied to scenes from familiar or from rustic life.

GENS D'ARMES, a title in France originally applied to all men liable to military service, and later to the body of nobles and gentry serving under the kings of France. In the present century it denotes the armed and mounted rural police.

GENTLEMEN-AT-ARMS (formerly called the *GENTLEMEN-PENSIONERS*), the bodyguard of the British sovereign, and with the exception of the yeomen of the guard, the oldest corps in the British service. It was instituted in 1509 by Henry VIII., and now consists of a captain, a lieutenant, a standard-bearer, a clerk of the cheque, and 40 gentlemen. The pay is issued from the privy purse. Until 1861 the commissions were purchasable as in other regiments; but by a royal command of that year this system was abolished, and commissions as gentlemen-at-arms have since only been given to military officers of service and distinction. The attendance of the gentlemen-at-arms is only required at drawing-rooms, levées, coronations, and similar important state ceremonies. The appointment, which is in the sole gift of the crown, on the recommendation of the commander-in-chief, can be held in conjunction with half-pay or retired full-pay, but not simultaneously with any appointment which might involve absence at the time of the officer's services being required by the sovereign.

GENTOO, the term applied by old English writers to the Hindoos, or natives of India; and especially to the Gentoo laws, a code compiled by Sir William Jones.

GENZANO, a town of Italy, 18 miles southeast of Rome, on the Appian Way. An annual flower festival, called the *Infiorata di Genzano*, is held here on the eighth day after Corpus Christi, and attracts many visitors. Population, 5,306.

GEOCENTRIC means having the earth for a center. Thus, the moon's motions are geocentric; also, though no other of the heavenly bodies re-

volve round the earth, their motions are spoken of as geocentric when referred to, or considered as they appear from, the earth.

GEODES (*Gr.*, "earthly"), rounded hollow concretions, or indurated nodules, either empty or containing a more or less solid and free nucleus, and having the cavity frequently lined with crystals. They are sometimes called "potato stones," on account of their size and shape.

GEORGE, a division of the western province of Cape Colony, Africa, on the south coast, east of Cape Town. It contains 2,600 square miles, and about 11,000 inhabitants. It is valuable chiefly for its pasturage and its timber. The town of George stands six miles north of the coast, and has a population of over 2,000. On the coast is the port of Mossil Bay.

GEORGE I. (CHRISTIAN WILLIAM FERDINAND ADOLPHUS GEORGE), King of the Hellenes, was born Dec. 24, 1845, and served for sometime in the Danish navy. After the abdication of Otho I., the late King of Greece, in 1863, the vacant throne was tendered to Prince Christian, who, with the concurrence of his own family and the consent of the Great Powers, accepted and began to reign as King George I. on June 6, 1863. Since the year 1876, when active trouble broke out in the Balkan Peninsula, King George's position has been very difficult; but as yet he has maintained it without going to war. His country gained a considerable addition of territory by the decision of the conference which followed the Congress of Berlin. In 1886, after the revolution at Philippopolis and the Servo-Bulgarian war, Greece (under a rash minister, M. Delyannis) was for declaring war against Turkey, and was only stopped by the firm attitude of England. He was married at St. Petersburg to the Princess Olga, daughter of the Grand Duke Constantine, Oct. 27, 1867. In 1892 they celebrated their silver wedding almost simultaneously with the golden wedding of his parents, the King and Queen of Denmark.

GEORGE, ENOCH (1767-1828), an American M. E. bishop. In 1790 he was admitted into the Virginia conference, and in 1796 was presiding elder of Charleston, S. C., district. In 1803 he joined the Baltimore conference, and in 1816 was ordained a bishop. He served in this office with zeal and success until his death.

GEORGE, HENRY, an American political economist, born in 1839. In 1879 he published *Progress and Poverty*, and in 1881 published *The Irish Land Question*. In the same year he visited England and Ireland, and in 1883-84 and again in 1884-85 he visited England and Scotland. He made speeches which produced a marked effect on the land question. In 1886 he was a candidate for mayor of New York on the United Labor Party ticket, receiving 68,110 against 90,552 for Abram S. Hewitt, the Democratic candidate, and 60,435 for Theodore Roosevelt, the Republican candidate. He then founded the "Standard," a weekly newspaper, and became its editor. He is also the author of *Social Problems* (1884), and *Protection or Free Trade* (1886).

GEORGE, LAKE, sometimes called Lake Horicon, a beautiful sheet of water in New York, extending from southwest to northeast, 36 miles long and from 1 to 3 miles wide, 310 feet above sea-level; 400 feet is its greatest depth; it contains 300 islands, and has an outlet into Lake Champlain. On its shores stood Forts George and William Henry. It is a favorite summer resort.

GEORGE'S CHANNEL, *Str.*, the name applied to the south portion of that arm of the Atlantic which separates Ireland from Britain. At its northern extremity it is 64 miles in width,

and at its southern about 62; its length from north-east to southwest is about 100 miles.

GEORGE, JAMES ZACHARIAH, born in Monroe county, Ga., Oct. 20, 1826; removed to Mississippi; served in the Mexican war, commanded a cavalry regiment during the war and in 1875 became Chief Justice of the State Supreme Court. On March 4, 1881, he took his seat in the United States Senate, to which he was reelected in 1886, and again in 1892. He was a member of the constitutional convention of Mississippi held in 1890 and framed the present constitution.

GEORGETOWN, the county-seat of Clear Creek county, Col., situated in a valley of the Rocky Mountains, 51 miles west of Denver, on two branches of Clear Creek. It is in an extensive silver region, and has large reduction works. Population, 1,927.

GEORGETOWN, the county-seat of Scott county, Ky., 12 miles north of Lexington. It is in the center of the "Blue-grass country," and the business of the vicinity is farming and stock-raising. The town contains a college, two female seminaries, other schools, and has good water-power. Population, 3,000.

GEORGETOWN, the county-seat of Brown county, Ohio, 7 miles from the Ohio River. It contains a woolen mill, flour mill, and the business of the vicinity is chiefly tobacco raising. Population, 1,473.

GEORGETOWN, the county-seat of Georgetown county, S. C., on Winyaw Bay. It has direct communication with New York by schooner lines; is located in a great turpentine region, and the village contains lumber and rice mills. Population, 2,895.

GEORGETOWN, the county-seat of Williamson county, Texas, 25 miles north of Austin. The region is healthful and picturesque, and the village contains the Southwestern University. Pop., 2,447.

GEORGETOWN, D. C., a port of entry. The heights are occupied by elegant villas, and command a fine view of the country around. The city contains a number of educational institutions, including a Roman Catholic college (1789). Population (1890), 14,046.

GEORGIA, an Atlantic State of the United States, and one of the original thirteen States (see Britannica, Vol. X, pp. 434-38). Under the present constitution, which was adopted in 1877, the legislative department consists of a senate of 44 members and a house of representatives of 175 members. Senators and representatives are each elected for two years. The legislature, called the general assembly, meets biennially on the first day of November of even years, and each session is limited to forty days. The executive department consists of a governor, secretary of State, treasurer, comptroller-general, attorney-general (each of whom is elected by the people for a term of two years), and a State school commissioner. The latter is appointed by the governor for a term of two years. General elections for State officers are held biennially on the first Wednesday of October of even years. The judicial department comprises a supreme court, with a chief justice and four associates; superior courts; courts of ordinary, corresponding to the county courts of other States; and justices' courts. The judges of the supreme and superior courts are selected by the general assembly, and hold office for four years each. The ordinaries and justices of the peace are elected by the people—the former for four years and the latter for two years. The State is represented in the United States Congress by two senators and ten representatives, and is thus entitled to twelve votes in the electoral college.

The educational interests of the State are under the general direction of a State school commis-

sioner and a State board of education, while local interests are directed by county school commissioners and county boards of education. Excellent systems of graded and high schools prevail throughout the State. The State University and its branches, the Atlanta University, and the high schools of Atlanta, Macon, Augusta, and Savannah, provide for special normal instruction. The State University is located at Athens, and has branches at Milledgeville, Cuthbert, Dahlonega, and Thomasville. There is an institution for the education of the deaf and dumb at Cave Spring, and an academy for the blind at Macon. Both of these are State institutions. The Wesleyan Female College, located at Macon, was the first chartered female college in the world. Other excellent private colleges, academies, and professional schools are located in various parts of the State.

According to the census of 1890 the area of Georgia was 59,475 square miles, and the population 1,837,353. The following table shows the population by counties for 1880 and 1890:

Counties.	Population.	
	1890.	1880.
Appling.....	8,676	5,275
Baker.....	6,144	7,307
Baldwin.....	14,608	13,806
Banks.....	8,562	7,337
Bartow.....	20,616	18,690
Berrien.....	10,694	6,519
Bibb.....	42,370	27,147
Brooks.....	18,979	11,737
Bryan.....	5,520	4,929
Bulloch.....	13,712	8,053
Burke.....	28,501	27,128
Butts.....	10,565	8,311
Candler.....	8,438	7,024
Calhoun.....	6,178	6,183
Camden.....	9,115	9,970
Campbell.....	22,301	16,901
Carroll.....	5,431	4,739
Catoosa.....	5,335	2,154
Charlton.....	37,740	45,023
Chatham.....	4,902	5,670
Chatahoochee.....	11,202	10,021
Chattooga.....	15,412	14,325
Cherokee.....	15,186	11,702
Clarke.....	7,817	6,650
Clay.....	8,235	8,027
Clayton.....	6,632	4,133
Clinch.....	22,286	20,743
Cobb.....	10,483	5,070
Colquitt.....	4,794	2,527
Columbia.....	11,281	10,465
Coweta.....	22,354	21,109
Crawford.....	9,315	8,650
Dade.....	5,707	4,702
Dawson.....	5,612	5,837
Decatur.....	19,949	19,072
De Kalb.....	17,189	14,497
Dodge.....	11,452	5,358
Dooley.....	18,146	12,830
Dougherty.....	12,306	12,632
Douglas.....	7,794	6,034
Early.....	9,792	7,611
Echols.....	3,079	2,553
Effingham.....	5,599	5,979
Elbert.....	15,376	12,367
Emanuel.....	14,703	9,759
Fannin.....	8,724	7,625
Fayette.....	8,728	8,605
Floyd.....	28,391	24,418
Forsyth.....	11,155	10,559
Franklin.....	14,670	11,453
Fulton.....	83,655	49,137
Gilmer.....	9,074	8,386
Glascock.....	3,720	3,577
Glynn.....	12,420	6,497
Gordon.....	12,758	11,171
Greene.....	17,051	17,547
Gwinnett.....	19,809	19,531
Habersham.....	11,573	8,718
Hall.....	18,047	15,298

Counties.	Population.	
	1890.	1880.
Hancock.....	17,149	16,989
Haralson.....	11,316	5,974
Harris.....	16,797	15,758
Hart.....	10,887	9,094
Heard.....	9,557	8,769
Henry.....	16,220	14,193
Houston.....	22,613	22,414
Irwin.....	5,316	2,686
Jackson.....	19,176	16,297
Jasper.....	13,879	11,851
Jefferson.....	17,313	15,671
Johnson.....	6,129	4,800
Jones.....	12,709	11,613
Laurens.....	13,747	10,053
Lee.....	9,774	10,577
Liberty.....	12,887	10,649
Lincoln.....	8,146	6,412
Lowndes.....	15,102	11,049
Lumpkin.....	6,867	6,526
McDuffie.....	8,789	9,449
McIntosh.....	6,470	6,241
Macon.....	13,183	11,675
Madison.....	11,024	7,978
Marion.....	7,728	8,593
Meriwether.....	20,650	17,651
Miller.....	4,275	3,720
Milton.....	6,208	6,261
Mitchell.....	10,906	9,392
Monroe.....	19,137	18,808
Montgomery.....	9,248	5,881
Morgan.....	16,041	14,032
Murray.....	8,451	8,249
Muscogee.....	27,761	19,322
Newton.....	14,310	13,623
Oconee.....	7,713	6,351
Oglethorpe.....	16,951	15,400
Paulding.....	11,948	10,887
Pickens.....	8,182	6,790
Pierce.....	6,379	4,538
Pike.....	16,300	15,849
Polk.....	14,945	11,932
Pulaski.....	16,559	14,058
Putnam.....	14,842	14,539
Quitman.....	4,471	4,392
Rabun.....	5,606	4,634
Randolph.....	15,267	13,341
Richmond.....	45,194	34,665
Rockdale.....	6,813	6,528
Schley.....	5,443	5,302
Screven.....	14,424	12,786
Spalding.....	13,117	12,585
Stewart.....	15,682	13,998
Sumter.....	22,107	18,239
Talbot.....	15,253	14,115
Taliaferro.....	7,291	7,034
Tattnall.....	10,253	6,983
Taylor.....	8,666	8,597
Telfair.....	5,477	4,828
Terrell.....	14,503	10,451
Thomas.....	26,154	20,597
Towns.....	4,064	3,261
Troup.....	20,723	20,565
Twiggs.....	8,195	8,313
Union.....	7,749	6,431
Upson.....	12,188	12,400
Walker.....	13,282	11,056
Walton.....	17,467	15,622
Ware.....	8,811	4,159
Warren.....	10,957	10,885
Washington.....	25,237	21,964
Wayne.....	7,485	5,980
Webster.....	5,695	2,377
White.....	6,151	5,941
Whitefield.....	12,916	11,900
Wilcox.....	7,980	3,109
Wilkes.....	12,081	15,985
Wilkinson.....	10,751	12,061
Worth.....	10,048	5,892

The population by decades was, in 1790, 82,548; 1800, 162,686; 1810, 252,434; 1820, 340,985; 1830, 516,823; 1840, 691,392; 1850, 906,185; 1860, 1,057,286; 1870, 1,184,109; 1880, 1,542,180; 1890, 1,837,353.

Cotton is the chief agricultural crop of Georgia. In 1888 there were 2,970,901 acres devoted to the culture of cotton, yielding 463,460,556 pounds,

valued at \$39,294,147. Indian corn came next with an acreage of 2,923,885, yielding 28,069,000 bushels, valued at \$16,841,400. Then came oats, with 618,687 acres, yielding 7,115,000 bushels, valued at \$3,770,950; wheat, 374,452 acres, yielding 1,910,000 bushels, valued at \$2,101,000; hay, 39,996 acres, yielding 47,995 tons, valued at \$646,013; potatoes, 10,291 acres, yielding 638,000 bushels, valued at \$574,238; rye, 28,456 acres, yielding 151,000 bushels, valued at \$135,735. January 1, 1890, there were in Georgia 115,629 horses, valued at \$9,582,125; 155,700 mules, valued at \$15,119,264; 354,618 milch cows, valued at \$6,113,614; 580,816 oxen and other cattle, valued at \$6,408,205; 411,846 sheep, valued at \$640,173; and 1,627,008 hogs, valued at \$5,379,540.

GOVERNORS OF GEORGIA

(Since the adoption of the United States Constitution).

George Walton.....	1789-90	William Schley.....	1835-37
Edward Telfair.....	1790-93	George B. Gilmer.....	1837-39
George Matthews.....	1793-96	Charles J. McDonald.....	1839-43
Jared Irwin.....	1796-98	George W. Crawford.....	1843-47
James Jackson.....	1798-1801	George W. B. Towns.....	1847-51
David Emanuel.....	1801	Howell Cobb.....	1851-53
Josiah Tattnall.....	1801-2	Herschell V. Johnson.....	1853-57
John Milledge.....	1802-6	Joseph E. Brown.....	1857-65
Jared Irwin.....	1806-9	James Johnson.....	1865
David B. Mitchell.....	1809-13	Rufus B. Bullock.....	1868-72
William Rabun.....	1817-19	James Milton Smith.....	1872-77
Matthew Talbot.....	1819	Alfred H. Colquhoun.....	1877-81
John Clark.....	1819-23	A. H. Stephens.....	1882-83
George M. Troup.....	1823-27	H. D. McDaniel.....	1883-84-86
John Forsyth.....	1827-29	John B. Gordon.....	1886-88-90
George R. Gilmer.....	1829-31	W. J. Northen.....	1890-
Wilson Lumpkins.....	1831-35		

GEORGIAN BAY, the northeastern part of Lake Huron, in the province of Ontario, Can. It is partly separated from the rest of the lake by a peninsula called Cabot's Head, and by the Great Manitoulin Island. It is about 120 miles long and 50 miles wide.

GEOTEUTHIS, a genus of fossil calamaries, peculiar to the Oolitic period. The shell or horny pen is broad and truncated in front and pointed behind, with the lateral wings shorter than the shaft. Some specimens are remarkably preserved, still showing the muscular mouth, the basis of the arms, and the ink-bag.

GERANICEÆ, an order of thalamifloral dicotyledons, herbs or undershrubs of temperate countries. The leading genera, *Geranium*, *Pelargonium* and *Erodium*, yield a great number of garden and greenhouse plants. In a wider sense the order is extended to include the closely related lints (*Linaceæ*) and sorrels (*Oxalidaceæ*), together with the *Balsaminaceæ*.

GERANIUM, a genus of exogenous plants, the type of the natural order *Geraniaceæ*, the limits of which correspond with those of the Linnean genus. This order contains at least 500 known species distributed over the world. See Britannica, Vol. IX, p. 439.

GERBIL, a rodent animal of the sub-family *Gerbillinae*, family *Muridae*, found chiefly in Asia, Africa, and Southern Europe. Gerbils are rat-like in appearance, but of a jumping habit, having elongated hind limbs. The genera are *Gerbillus*, *Mystromys*, *Otomys*, and *Dasyomys*.

GERKI, a town of the Saccato country, Africa, about 50 miles northeast of Kano. It is surrounded with walls. Population, 15,000.

GERM THEORY OF DISEASE, the view that epidemic diseases are due to bacteria, or vegetable cells, which enter the body with the air we breathe, the water we drink, and the food we eat. In some cases they enter the body by contact. They generally increase very rapidly, pervade the

system in the vital parts, undermine the strength of the body gradually and most usually terminate in the death of the individual. This theory is now definitely proved in the cases of cholera, yellow fever, typhus, consumption, small-pox, syphilis, gonorrhœa; and, in several other diseases, the presumption is strong in favor of its correctness.

Leewenhoeck observed these vegetable cells as early as 1675, and O. F. Müller classified them in 1773. But that they were the causes of the infectious diseases was not admitted even during the first half of this century, although Kircher in Germany, and Linnæus in Sweden, had advanced the idea that some of the epidemic diseases are due to bacteria. The common belief was that these diseases are caused by decaying vegetable and animal matter, as it seemed to be apparent in the case of malaria; that decaying organic matter acts as a poison; when its effluvia are taken into the body that they set up similar processes of degeneration and decay in the living tissues.

But in 1836 Cagniard de la Tour discovered that the action of yeast is caused by bacteria, or living plant-cells; and Schwann found in 1837 that putrefaction is originated in a similar way. In 1850 Rayeraud Davaine observed in the blood of cattle dead of splenic fever (called anthrax) the bacillus anthracis, a hair-like bacterium; and in 1863 Davaine proved that the anthrax bacilli are the cause of splenic fever. He produced this fever by inoculating animals with these bacilli. In 1865 L. Pasteur proved, conclusively, that a disease of the silk worms, called pebrine, which threatened to destroy the silk industry of France, was due to minute vibratile corpuscles, which filled the bodies of the silk worms and checked their vital operations. He also showed that this disease can be overcome by protecting the worms from infection.

Koch in Berlin, and Pasteur in Paris, soon afterwards made experiments with Davaine's *anthrax bacilli* and produced the splenic fever in numerous cases by inoculation; they also showed that this disease never appears in animals that are rigidly isolated from infectious material. Cultivation of *bacillus anthracis* in infusions, through several generations, was found to weaken the vitality of the germs, especially through the action of the ozone contained in the air. The subsequent inoculation of cattle with this weakened material produced in them a mild form of the disease which protected them against the effects of subsequent inoculations with the strongest virus. Thousands of cattle have been annually saved from the fatal milt fever in France alone by inoculating them with the weakened culture germs.

More recently Pasteur made researches especially into the cause and cure of rabies, the "mad-dog disease" in men and animals. He has shown that a bacterium is present in this disease, that it can be communicated by inoculation to healthy animals of various species, and that its energy may be reduced by producing a mild and harmless form of hydrophobia in men and animals bitten by mad dogs. Pasteur has also proved the parasitic origin of chicken-cholera.

Of all human diseases, it has been most clearly demonstrated in the case of small-pox that the inoculation of or contact with the bacterial matter is capable of producing the disease. In septicæmia, the inflammation of open wounds and the resulting blood poisoning are due to minute bacteria floating in the air, with which the wounds come in contact. If the instruments used in surgical opera-

tions are carefully disinfected, and the wounds are treated with sprays of carbolic acid or mercuric chloride and lotions capable of killing the bacteria present in the air, etc., the fatal disease of blood-poisoning will be prevented.

Bacteria have been discovered and isolated in diphtheria, typhoid, yellow and malarial fevers, and most recently in cholera and tuberculosis. Koch found in the tubercle of consumption a germ similar to the bacterium of leprosy. By inoculating rabbits and guinea pigs with this bacteria he produced in them genuine tuberculosis. In the intestines of cholera patients in India and Egypt he found millions of bacteria of several kinds, some of them harmless. But one kind, comma-shaped, was peculiar, and present in all cholera patients. He called it the comma bacillus. He considers it the cause of the disease, although it has been doubted by others.

The recent researches with the microscope prove that malaria (swamp fever, fever and ague) is due to a germ found in the blood of the patients. This germ is called the *plasmodium of malaria*. It can be demonstrated in every case of the disease by drawing a drop of blood and examining it carefully under a good microscope. The presence of this plasmodium is always accompanied by the same series of symptoms; and as these symptoms cease as soon as the germs disappear, the conclusion is inevitable that the germs are the true cause of the disease. Dr. Walter B. James, of New York, stated, recently, before the New York Academy of Medicine, that he had examined the blood in several hundred cases of malaria, and found the plasmodium present in all cases.

In hydrophobia and septicæmia, the microbes are introduced by contact with open wounds; but in syphilis and gonorrhœa no open wounds are required for causing infection. In these cases the disease germs are of animal growth.

GERMAIN, ANTOINE HENRI, born at Lyons, France, February 19, 1824; founded the Crédit Lyonnais, of which he is chairman. In 1869 he entered the National Assembly as a Liberal, and is still a representative, acting with the Left Center, and recognized as a high authority on financial questions. He is opposed to the present financial policy of the Republic.

GERMANIUM, a metallic element discovered in 1885 by Dr. Winckler in a silver ore (argyrodite); symbol, Ge; atomic weight, 72.3. It has a melting-point about 1650° F. (900° C.); is oxidised when heated in air; crystallises in octahedra; has a perfectly metallic luster, and is of a grayish-white color. The new metal was named after Germany. Fifteen years before its discovery its existence was prophesied by Mendeleëff.

GERMANO, SAN, a beautiful and prosperous town of Italy, situated at the base of Monte Casino, in the province of Terri di Lavoro, about 50 miles north-northwest of Naples. It contains handsome public edifices, and is surrounded by the remains of monuments and buildings of high antiquarian interest; it is built on the site and from the ruins of the ancient Volscian town, Casinum, or Casca. The district of San Germano is highly cultivated and beautiful. Population, 8,766. See MONTE CASINO, Britannica, Vol. XVI, p. 778.

GERMANTOWN, a former borough of Pennsylvania, included since 1854 in the limits of Philadelphia. Here an attack by Washington on the British camp in the early morning of Oct. 4, 1777, was repulsed, the Americans losing 1,000 men, the British 600. Population (1890), 22,000.

GERMANY

GERMANY. For the geography, history, productions, government, language, literature, and earlier statistics of Germany, and the German States, see *Britannica*, Vol. X, pp. 447-547. Present total area, 208,738 English square miles; population

in 1890, 49,416,476. Capital, Berlin, with a population of 1,579,244.

STATES, AREA AND POPULATION.—The following are the official figures giving the returns for December, 1885, and Dec. 1, 1890, and the density for 1890:

STATES OF THE EMPIRE.	Area English sq. miles.	Population Dec. 1, 1885.	Population Dec. 1, 1890.	Density per sq. mile 1890.
Prussia (with Heligoland).....	194,463	28,318,470	29,955,381	322.8
Bavaria.....	29,282	5,420,199	5,589,382	190.8
Württemberg.....	7,528	1,995,185	2,035,443	270.4
Baden.....	5,821	1,601,255	1,656,317	284.6
Saxony.....	5,787	3,182,003	3,500,513	604.7
Mecklenburg-Schwerin.....	5,135	575,152	578,565	112.6
Hesse.....	2,965	956,611	993,659	335.1
Oldenburg.....	2,479	241,525	354,968	143.2
Brunswick.....	1,424	372,452	408,029	283.0
Saxe-Weimar.....	1,388	313,940	326,091	234.8
Mecklenburg-Strelitz.....	1,131	98,371	97,978	86.6
Saxe-Meiningen.....	953	214,884	228,829	234.8
Anhalt.....	906	248,166	271,759	299.9
Saxe-Coburg-Gotha.....	755	198,829	206,513	273.5
Saxe-Altenburg.....	511	161,460	170,864	332.4
Lippe.....	469	123,212	128,414	273.8
Waldeck.....	433	56,576	57,283	132.4
Schwarzburg-Rudolstadt.....	363	89,836	85,863	236.5
Schwarzburg-Sondershausen.....	333	79,606	76,510	226.7
Reuss-Schleiz.....	319	110,598	118,811	376.5
Schaumburg-Lippe.....	131	37,204	39,183	299.1
Reuss-Greiz.....	122	55,904	62,754	514.3
Hamburg.....	158	518,620	622,530	3,949.1
Lübeck.....	115	67,658	76,485	665.1
Bremen.....	99	165,628	180,443	1,822.6
Alsace-Lorraine.....	5,668	1,564,355	1,603,987	282.9
Total.....	208,738	46,855,704	49,416,476	286.7

PRESENT EMPEROR AND ROYAL FAMILY.—Wilhelm II, born Jan. 27, 1859, eldest son of Friedrich III, German Emperor and King of Prussia—who was the eldest son of Wilhelm I, and was born Oct. 18, 1831; married Jan. 25, 1858, to Victoria (Empress and Queen Friedrich), Princess Royal of Great Britain, succeeded his father March 9, 1888, and died June 15, 1888, when he was succeeded by his son, Prince Friedrich Wilhelm, under the title of Wilhelm II. The Emperor married, Feb. 27, 1881, Princess Victoria; married Nov. 19, 1891, to Prince Adolphus of Schaumburg-Lippe. Born Oct. 22, 1858, daughter of the late Duke Friedrich of Schleswig-Holstein-Sonderburg-Augustenburg.

CHILDREN OF THE EMPEROR.—1. Prince Friedrich Wilhelm Victor August Ernst, born May 6, 1882, Crown-Prince of the German Empire and of Prussia; 2. Prince Wilhelm Eitel-Friedrich Christian Karl, July 7, 1883; 3. Prince Adalbert Ferdinand Berenger Victor, July 14, 1884; 4. Prince August Wilhelm Heinrich Günther Victor, Jan. 29, 1887; 5. Prince Oscar Karl Gustav Adolf, July 27, 1888; 6. Prince Joachim Franz Humbert, Dec. 17, 1890.

BROTHER AND SISTERS OF THE EMPEROR.—1. Princess Charlotte, born July 24, 1860; married Feb. 18, 1878, to Prince Bernhard, eldest son of Duke George II, of Saxe-Meiningen; offspring of the union is a daughter, Feodora, born May 12, 1879. 2. Prince Heinrich, born Aug. 14, 1862; married May 24, 1888, to Princess Irene, daughter of Grand-Duke Ludwig IV, of Hesse; offspring of the union is a son, Waldemar, born March 20, 1889. 3. Princess Victoria, born April 12, 1866. 4. Princess Sophie Dorothea, born June 14, 1870; married Oct. 27, 1889, to Crown-Prince Konstantin, of

Greece. 5. Princess Margarethe, born April 22, 1872.

AUNT OF THE EMPEROR.—Princess Louise, born Dec. 3, 1838; married Sept. 20, 1856, to Grand-Duke Friedrich, of Baden.

EMPERORS OF PRESENT EMPIRE.—1. Wilhelm I, from April 16, 1871, to March 9, 1888. 2. Friedrich, from March 9, 1888, to June 15, 1888. 3. Wilhelm II, from June 15, 1888.

SUPPORT OF THE ROYAL FAMILY.—The election of Wilhelm I, king of Prussia, as emperor of Germany bears date from April 16, 1871. The election was by vote of the Reichstag of the North German Confederation, on the initiative of all the reigning princes of Germany. The imperial dignity is now hereditary in the Prussian royal house of Hohenzollern, following the usual law of primogeniture, and the support of the royal family is provided for by the Prussian constitution. Up to within a recent period the kings of Prussia enjoyed the whole income of the state domains, amounting to about a million sterling per annum. By a decree of Jan. 17, 1820, King Friedrich Wilhelm III fixed the Krondotations at the total sum of 2,573,098½ thalers, which was sanctioned on Jan. 31, 1850, by art. 59 of the constitution; remaining, as before, dependent on the revenue derived from domains and forests. The amount of the civil list was fixed by art. 59 of the constitution of Jan. 31, 1850; but by law of April 30, 1859, it was raised 500,000 thalers; by law of Jan. 27, 1868, 1,000,000 thalers, and by law of Feb. 20, 1889, a further 3,500,000 marks. At present the total "Krondotations Rente," as far as it figures in the budgets, amounts to 15,719,296 marks, or \$3,752,770. The reigning house is also in possession

of a vast amount of private property, comprising castles, forests, and great landed estates in various parts of the kingdom, known as "Fideikommiss-und-Schatullgüter," the revenue from which mainly serves to defray the expenditure of the court and the members of the royal family.

The Royal Fideikommiss was last regulated by cabinet order of Aug. 30, 1843. Besides this the royal crown treasure, founded by King Friedrich Wilhelm III, consists of a capital of 6 millions, which has since considerably increased, and also the family Fideikommiss, likewise founded by King Friedrich Wilhelm III, for the benefit of princes born afterwards. It comprises the domains of Flatow, Krojanke and Frauendorf, as well as the Fideikommiss founded by the late Prince Karl (Glienicke). Finally, the royal house is also entitled to the House Fideikommiss of the Hohenzollern princes.

CHANCELLOR AND IMPERIAL SECRETARIES.—General Georg von Caprivi, the successor of Prince Bismarck as Chancellor of the empire, and president of the Prussian Council of Ministers, was born in 1831; entered the army in 1849; became chief of staff to the 10th corps, 1870; was appointed commander of the 30th division at Metz, 1883; was appointed head of the admiralty in 1884; and was appointed Chancellor of the empire and president of the Prussian Council, March 20, 1890. Salary, 54,000 marks.

Representative of the Chancellor and Imperial Secretary of State for the Home Office, Dr. Carl Heinrich von Boetticher, born Jan. 6, 1833; studied jurisprudence and entered state service, 1856; Landdrost at Hanover; 1876, Regierungspräsident at Schleswig; appointed Imperial Secretary of State, September, 1880; and in 1881 representative of the Chancellor of the empire. Salary, 36,000 marks.

The imperial secretaries of state number 12, including the Chancellor. They do not form a "cabinet," but act independently of one another, under the general supervision of the Chancellor. Under the latter they are the executive heads severally of the Imperial Departments, viz.: Foreign Affairs; Home Office; Admiralty; Ministry of Justice; Treasury; Post Office; Railways; Exchequer; Invalid Fund; Imperial Bank; Debt Commission. Salary of each of the department secretaries, 36,000 marks.

CONSTITUTION AND GOVERNMENT.—The constitution of the empire bears date April 16, 1871. By its terms all the States of Germany "form an eternal union for the protection of the realm and the care of the welfare of the German people." The supreme direction of the military and political affairs of the empire is vested in the king of Prussia, who, in this capacity, bears the title of Deutscher Kaiser. According to art. 2 of the constitution, "the emperor represents the empire internationally," and can declare war, if defensive, and make peace, as well as enter into treaties with other nations, and appoint and receive ambassadors. To declare war, if not merely defensive, the Kaiser must have the consent of the Bundesrath, or Federal Council, in which body, together with the Reichstag, or Diet of the Realm, are vested the legislative functions of the empire. The Bundesrath represents the individual States of Germany, and the Reichstag the German nation. The members of the Bundesrath, fifty-eight in number, are appointed by the governments of the individual States for each session, while the members of the Reichstag, 397 in number (about one for every 118,000 inhabitants), are elected by universal suffrage and ballot for the term of three years. By the law of March 19, 1888,

the duration of the legislative period is five years; the law to come into force in the legislative period beginning in 1890. The various States of Germany are represented as follows in the Bundesrath and the Reichstag:

States of the Empire.	Number of Members in Bundesrath.	Number of Deputies in Reichstag.
Kingdom of Prussia.....	17	236
" " Bavaria.....	6	48
" " Württemberg.....	4	27
" " Saxony.....	4	27
Grand-Duchy of Baden.....	3	14
" " Mecklenburg-Schwerin.....	2	6
" " Hesse.....	3	9
" " Oldenburg.....	1	3
" " Saxe-Weimar.....	1	3
" " Mecklenburg-Strelitz.....	2	3
Duchy of Brunswick.....	2	3
" " Saxe-Meiningen.....	1	2
" " Anhalt.....	1	2
" " Saxe-Coburg-Gotha.....	1	2
" " Saxe-Altenburg.....	1	1
Principality of Waldeck.....	1	1
" " Lippe.....	1	1
" " Schwarzburg-Rudolstadt.....	1	1
" " Schwarzburg-Sondershausen.....	1	1
" " Reuss-Schleiz.....	1	1
" " Schaumburg-Lippe.....	1	1
" " Reuss-Greiz.....	1	3
Free town of Hamburg.....	1	1
" " Lübeck.....	1	1
" " Bremen.....	1	1
Reichsland of Alsace-Lorraine.....	.....	15
Total.....	58	397

Alsace-Lorraine is represented in the Bundesrath by four commissioners (*Kommissäre*) without votes, who are nominated by the Statthalter.

The total number of electors to the Reichstag inscribed on the lists was 10,145,877, or 21.7 per cent. of the population at the general election of 1890, while the number of actual effective voters was 7,261,659 at the same election, or 71.6 per cent. of the total electors; in 1890 it was 7,031,460. Of the 397 electoral districts 21 consists solely of towns, 107 of districts each containing a town of at least 20,000 inhabitants, and 269 of districts without any large towns. In 252 districts Protestantism is predominant, and in the remainder Roman Catholicism claims the majority. Of electoral districts with 60,000 of a population and under, there were 5 in 1887; between 60,000 and 80,000, 26; between 80,000 and 100,000, 74; between 100,000 and 120,000, 180; between 120,000 and 140,000, 105; between 140,000 and 160,000, 21; and above 160,000, 36. Of electoral districts with 12,000 voters or less, there were 4 in 1887; 12,000-16,000, 26; 16,000-20,000, 60; 20,000-24,000, 121; 24,000-28,000, 103; 28,000-32,000, 41; above 32,000 voters, 42.

Both the Bundesrath and the Reichstag meet in annual session, convoked by the Emperor. The Emperor has the right to prerogative and dissolve, after a vote by the Bundesrath, the Reichstag. Without consent of the Reichstag the prorogation may not exceed 30 days; while in case of dissolution new elections must take place within 60 days, and a new session must open within 90 days. All law for the empire must receive the votes of an absolute majority of the Bundesrath and the Reichstag. The Bundesrath is presided over by the Reichskanzler, or Chancellor of the Empire, and the president of the Reichstag is elected by the deputies.

The laws of the empire, passed by the Bundesrath and the Reichstag, to take effect, must receive the assent of the Emperor, and be countersigned when promulgated by the chancellor of the empire. All the members of the Bundesrath have the right to be present at the deliberations of the Reichstag.

Acting under the direction of the chancellor of the empire, the Bundesrath represents also a supreme administrative and consultative board, and as such has twelve standing committees—namely, for army and fortifications; for naval matters; tariff, excise, and taxes; trade and commerce; railways, posts, and telegraphs; civil and criminal law; financial accounts; foreign affairs; for Alsace-Lorraine; for the constitution; for the standing orders; and for railway tariffs. Each committee consists of representatives of at least four states of the empire; but the foreign affairs committee includes only the representatives of Bavaria, Saxony, Württemberg, and two other representatives to be elected every year.

The most recent occupation census gives the number of persons in the empire engaged in agriculture and cattle-raising as 18,840,818 out of a total of 48,000,000; in forestry, hunting and fishing, 384,637; in mining, metal works, etc., 16,058,080; in trade and commerce, 4,531,080; in domestic and other service, 938,291; in the professions, 2,222,982; without occupation or profession, 2,246,222.

The bulk of the German population is (on the basis of language) Teutonic; but in the Prussian provinces of Posen, Silesia, West and East Prussia are 2,513,500 Slavs (Poles), who, with 280,000 Walloons and French, 150,000 Lithuanians, 140,000 Danes, and about the same number of Wends, Moravians, and Bohemians, make up 3,223,500 non-Germanic inhabitants, or nearly 7 per cent. of the total population.

On Dec. 1, 1885, there were 434,525 foreigners resident in Germany, the nationalities of whom were as follows:

Austrian	155,331	British	14,889
Russian	48,853	Swedes, Norwegians ..	13,174
Dutch	45,270	Luxemburgers	11,607
Swiss	36,902	Other Europeans	26,611
French	36,708	From United States ..	15,017
Danish	20,348	Other non-Europeans ..	8,638

Besides 111 born at sea, and 1,116 of unknown nationality. In 1880 the number of foreigners was only 275,856.

The great majority of the emigrants sail from German ports and Antwerp. In 1885-90, 21,519 embarked at Rotterdam or Amsterdam; and in 1885-90 a yearly average of 4,622 at French ports, notably Havre and Bordeaux. The emigrants of 1890 by way of German ports, Antwerp, Rotterdam and Amsterdam, comprised 50,019 males, 41,906 females (76 sex not stated). The number of families was 13,024, including 40,874 persons. During the sixty-eight years from 1820 to 1890 the total emigration to the United States, which absorbs the best classes of emigrants, numbered over four and a half million individuals, and during the last twelve years nearly a million and a half. It is calculated that each represented on the average, a money value of 200 marks, or \$50, so that the total loss by this emigration amounted to over \$225,000,000. The number of emigrants to Brazil during the last twenty years (1871 to 1890) has been 39,972.

There are in Germany 21 towns of over 100,000 inhabitants, viz.: Berlin (1,579,244), Hamburg (323,923), Altona (143,249), Breslau (335,174), Munich

(348,317), Dresden (276,085), Elberfeld (125,830), Barmen (116,248), Leipzig (293,525), Cologne (281,273), Frankfurt-on-the-Main (179,850), Königsberg (161,528), Hanover (165,499), Stuttgart (189,659), Bremen (124,887), Nuremberg (142,403), Düsseldorf (144,632), Danzig (120,459), Magdeburg (202,235), Strasburg (123,545), Chemnitz (138,955).

EDUCATION AND RELIGION.—There are 21 universities in the empire, with 2,383 professors and teachers, attended by about 28,711 matriculated students. Education is general and compulsory throughout Germany. The laws of Prussia, which provide for the establishment of elementary schools (*Volksschulen*), supported from the local rates, in every town and village, and compel all parents to send their children to these or other schools, have been adopted, with slight modifications, in all the states of the empire. The school age is from six to fourteen. The system of secondary education is also practically homogeneous. Above the elementary schools rank the middle schools of the towns, the *Bürgerschulen*, and *Höhere Bürgerschulen*, which fit their pupils for business life. Children of the working classes may continue their education at the *Fortbildungs-Schulen*, or continuation schools, which are open in the evening or other convenient time. The *Gymnasien* are the most fully developed classical schools, preparing pupils in a nine years' course for the universities and the learned professions. The *Progymnasien* differ from these only in not having the highest classes. In the *Realgymnasien*, Latin, but not Greek, is taught, and what are usually termed "modern subjects" have more time devoted to them. *Realprogymnasien* have a similar course, but have no class corresponding to the highest class in the preceding. In the *Oberrealschulen* and *Realschulen* Latin is wholly displaced in favor of modern languages. In 1889, 973 secondary schools, including 53 private schools, possessed the right of granting certificates to pupils who pass the leaving examination (*Abiturienten Examen*), entitling them to serve in the army as one-year volunteers. The teachers in German schools are required to hold a government certificate, and to have undergone a year's probation. Higher schools for girls are called *Höhere Töchterschulen*. Besides these there are numerous *Gewerbeschulen*, or technical schools, *PolYTECHNICA*, normal schools, seminaries, and the universities. The total number of children of school age in 1885 was 8,609,198.

According to the last religious census, there were 29,369,847 Protestants (62.7 per cent.), 16,785,734 Catholics (35.8 per cent.), 563,172 Jews (1.2 per cent.). Adherents of the Greek church are included in "Roman Catholics," but the Old Catholics are reckoned among "Other Christians." Certain changes were introduced in 1885 in the grouping of "Other Christians" and "Others," which explain the differences between the returns for these groups for 1880 and 1885. Roman Catholics are in the majority in only three of the German States, and form more than 20 per cent. of the population in only four others.

JUSTICE AND CRIME.—In terms of judicature acts in 1877 and 1879 a uniform system of law courts was adopted throughout the empire not later than Jan. 1, 1879, though, with the exception of the Reichsgericht, all courts are directly subject to the government of the special state in which they exercise jurisdiction, and not to the Imperial government. The appointment of the judges is also a state and not an imperial function. The empire enjoys uniform codes of commercial and criminal law, though no uniform code of civil law has yet been adopted.

The lowest courts of first instance are the *Amtsgerichte*, each with a single judge, competent to try petty civil and criminal cases. There are 1,915 *Amtsgerichte* in the empire, or one for every 25,808 inhabitants. The *Landgerichte* exercise a revising jurisdiction over the *Amtsgerichte*, and also a more extensive original jurisdiction in both civil and criminal cases, divorce cases, etc. In the criminal chamber five judges sit, and a majority of four votes is required for a conviction. Jury courts (*Schwurgerichte*) are also held periodically, in which three judges preside; the jury are twelve in number. There are 171 *Landgerichte* in the empire, or one for every 289,023 of the population. The first court of second instance is the *Oberlandesgerichte*. In its criminal senate, which also has an original jurisdiction in serious cases, the number of the judges is seven. There are 28 such courts in the empire. The total number of judges on the bench in all the courts above mentioned is 7,159. In Bavaria alone there is an *Oberste Landesgericht* with 18 judges, with a revising jurisdiction over the Bavarian *Oberlandesgerichte*. The supreme court is the *Reichsgericht*, which sits at Leipsic. The judges, 79 in number, are appointed by the Emperor on the advice of the Bundesrath. The court exercises an appellate jurisdiction over all inferior courts, and also an original jurisdiction in cases of treason. It has four criminal and six civil senates.

THE GERMAN ARMY.—The German army on a peace footing consists of 20,440 officers and 491,217 men, with 93,908 horses and 1,914 guns from Oct. 1, 1890.* On a war footing the total strength amounts to 35,427 officers and 1,456,677 men, with 312,731 horses and 2,808 guns. The field army has 744,031 men and 19,391 officers, 242,415 horses and 2,040 guns; the depot troops, *Ersatztruppen*, number 296,614 men, 4,796 officers, with 31,373 horses and 444 guns; the garrison troops, *Besatzungstruppen*, with 416,032 men, 11,240 officers, 38,943 horses, and 324 guns. The *Landsturm*, a last reserve, is not included in the above, but it is not organized in time of peace. Service in the army is compulsory. In 1887, 41,135 men, forming 31 battalions, 24 field batteries, 9 companies of pioneers, and 14 of train, were added to the peace establishment. On a war footing, Germany is prepared to place more than 3,350,000 men in the field, fully armed. As no official statement respecting the army is issued, the above figures are said to be merely conjectural.

Germany has a total frontier length of 4,570 miles. On the north it is bounded by the North Sea (293 miles), Denmark (47 miles), and the Baltic (927 miles); on the south, well-defined mountain ranges and the Lake of Constance separate it from Austria (1,403 miles) and Switzerland (256 miles). On the remaining sides, however, the boundaries are chiefly conventional, except in the southwest, where the Vosges Mountains separate Germany and France. On the east Germany is bounded by Russia for 843 miles; on the west by France (242 miles), Luxemburg (111 miles), Belgium (70 miles), and Holland (377 miles).

Some of the coast defenses and batteries have been placed under the jurisdiction of the admiralty. The empire is at present divided into ten "fortress districts" (*Festungs-Inspection*), each including a certain area with fortified places. It has 17 fortified places of the first class, serving as fortified camps, and 19 other fortresses. These

fortresses are all connected with each other by means of underground telegraphs, while strategical railway lines lead from the principal military centers towards the frontiers.

All German troops are bound by the imperial constitution of April 16, 1871, to obey unconditionally the orders of the Kaiser, and must swear accordingly the oath of fidelity. But this oath to the Kaiser is not imposed upon the Bavarian troops in time of peace. Art. 65 of the constitution gives the Emperor the right of ordering the erection of fortresses in any part of the empire; and art. 68 invests him with the power, in case of threatened disturbance of order, to declare any country or district in a state of siege. The constitution of the army is regulated by various military laws passed between 1867 and 1888; the Prussian military legislation before 1871 being extended to the empire.

By the constitution of April 16, 1871, it is enacted that "every German is liable to service—and no substitution is allowed." Every German capable of bearing arms has to be in the standing army (or navy) for seven years, as a rule from the finished twentieth till the commencing twenty-eighth year of his age, though liability to service begins on the completion of the seventeenth year. Of the seven years, three must be spent in active service and the remaining four in the army of reserve. Conscripts, whose conduct or proficiency earns them the privilege, are sometimes discharged from active service at the end of two years, though liable to recall. They are familiarly known as "*Königs Urlauber*." After quitting the army of reserve, the conscript has to form part of the *Landwehr* for another five years in the first class or "ban," and up to his thirty-ninth year in the second "ban."

About 400,000 young men reach the age of twenty every year, and when the numbers of those morally or physically unfit to serve, of volunteers and of emigrants, are deducted, about 300,000 are left liable to service. Of these, however, owing to the legal limitation of the peace strength, only a certain number (chosen by lot) join the army; the remainder are drafted into the *Ersatztruppen*, a kind of reserve, where the period of service is twelve years. Men in the *Ersatztruppen*, are liable to three periods of drill (of ten, six, and four weeks, respectively); but as financial considerations allow of only a certain number being so drilled, many receive no military training at all. At the end of twelve years the trained members of the *Ersatz* pass into the first ban of the *Landsturm*, the untrained into the second ban.

One-year volunteers, of whom about 8,000 join annually, serve at their own charges, and are not reckoned in the legal peace strength. Non-commissioned officers are generally appointed from men desiring to make the army their profession.

All able-bodied men between the ages of seventeen and forty-five, who are neither in the standing army nor the reserves, must belong to the *Landsturm*, which is only called out in the event of an invasion of Germany. The *Landsturm* is divided into two classes, or "bans." To the first ban belong those between the ages of seventeen and thirty-nine; to the second, those between thirty-nine and forty-five.

The mass of soldiers thus raised is divided into companies, battalions, regiments, and corps d'armée. The strength of an ordinary battalion in peace is 544 men, raised in war to 1,002 by calling in part of the reserves; it is divided into four companies, each of which in war consists of 250 men. Exceptions to this general rule are the battalions of the Guards and the regiments in garrison in the Reichsland of Alsace-Lorraine, the strength of

* By the law of March 11, 1887, to continue in force to March 31, 1894, the peace strength of the imperial army is 468,409 men, besides officers, surgeons, paymasters, etc.—in all, 491,955.

which, on peace footing, is 686 men. During peace each regiment of infantry consists generally of three battalions, but fifteen regiments have four battalions each; each brigade of two regiments; each infantry division of two brigades, to which, under the command of the divisional general, four squadrons of cavalry, four batteries of artillery, each of six guns, and either a battalion of riflemen or a battalion of pioneers are attached. Each field artillery regiment is divided into three detachments, each of three or four batteries. In all there are 434 field batteries, of which 47 are mounted. Each battery numbers, as a rule, in peace four, in war six, fully mounted guns. In war the strength can be raised to 455 batteries. The corps d'armée is considered a unit which is independent in itself, and includes not only troops of all three arms, but a portion of all the stores and appliances which are required by a whole army. Each corps d'armée consists of two divisions of infantry, a cavalry division of four regiments, with two horse-artillery batteries attached, besides the two cavalry regiments attached to the infantry divisions, and a reserve of artillery of six field batteries and one mounted battery. There is, moreover, attached to each corps d'armée one battalion of pioneers and one of train.

The corps d'armée, with the exception of the corps of the Guards, are locally distributed through the empire.

In November, 1889, it was resolved to add two new army corps, making a total of 21. The infantry and rifles are armed with Mauser's breech-loading repeating rifle, carrying eight cartridges in the magazine and one in the chamber, with an extreme range of 3,300 yards; weight, 10 lbs. 1 oz., with bayonet, 11 lbs. 13 oz. The cavalry have swords and carbines; the lancers, swords and lances, 10 feet long, weighing $4\frac{1}{2}$ lbs.

THE GERMAN NAVY.—The imperial navy in 1891, exclusive of torpedo boats, consisted of 77 steam and sailing vessels, with 511 guns, including 29 ironclads, mounting 182 guns, 28 cruisers, with 18,051 men. There are in all 34 torpedo vessels. The following ships were in process of construction in 1890: 4 belted cruisers of 9,000 to 10,000 tons; 9 coast-defense armor-clads of 3,800 tons each; one deck-protected cruiser of 4,230 tons and 7,000 horse-power; one torpedo gunboat of 2,000 tons and 5,400 horse-power, speed 19 knots; one torpedo dispatch vessel of 1,240 tons, 4,000* horse-power, 19 knots; 2 gun-vessels of 1,100 tons, 1,500 horse-power, 14 knots. The *König Wilhelm* is the largest of the ironclads, carrying 29 guns of hammered steel.

The German navy, according to the budget of 1891, was commanded by 12 admirals, under whom there were 921 officers of all kinds, including engineers and surgeons, and 16,150 non-commissioned officers, men and sailors. The sailors of the fleet and marines are raised by conscription from among the sea-faring population, which on this account are exempt from service in the army. The total sea-faring population of Germany is estimated at 80,000, of whom 48,000 are serving in the merchant navy at home, and 6,000 in foreign navies.

Germany has two ports of war—at Kiel, on the Baltic, and Wilhelmshaven in the bay of Jade on the North Sea. The port of Wilhelmshaven is a vast artificial construction of granite, and comprises five separate harbors, with canals, sluices to regulate the tide, and an array of dry docks for ordinary and ironclad vessels.

EXPENDITURE, REVENUE, AND IMPERIAL DEBT.—The following table gives the estimated total

revenue and expenditure (including supplements) for the financial year ending March 31, 1892:

Expenditure.	Marks.
Reichstag.....	390,025
Chancellery.....	148,360
Foreign Office.....	9,161,415
Home Office.....	16,221,098
Imperial Army.....	412,550,954
Imperial Navy.....	42,818,633
Ministry of Justice.....	1,956,166
Imperial Treasury.....	336,216,420
Railways.....	334,000
Debt of Empire.....	53,861,500
Audit Office.....	607,583
Pension Fund.....	40,905,640
Invalid Fund.....	25,453,293
Increase of salaries.....	540,000
Total ordinary expenditure.....	941,135,067
Extraordinary expenditure.....	189,510,821
Grand total.....	1,130,645,888

Revenue.	Marks.
Customs and Excise Duties.....	588,996,146
Stamps.....	34,505,000
Posts and Telegraphs.....	23,790,807
Printing Office.....	1,185,300
Railways.....	20,398,500
Imperial Bank.....	2,631,700
Various departmental receipts.....	8,739,749
Interest of Invalid Fund.....	25,453,293
Interest of Imperial Funds.....	441,600
Various.....	3,128,955
Extraordinary receipts.....	98,790,369
Federal contributions.....	322,623,505
Grand total.....	1,130,645,888

The extraordinary expenditure for 1891-92 includes an expenditure of 71,303,510 marks for military purposes, 51,062,150 marks for the navy, 30,700,000 for the interior, and 10,242,500 marks for the imperial debt.

For 1891-92 the Federal contributions (*Matricular Beiträge*) amount to 316,599,300 marks, to which the principal States contribute as follows:

States.	Marks.
Prussia.....	184,678,100
Bavaria.....	41,607,600
Württemberg.....	15,409,800
Saxony.....	20,745,900
Baden.....	11,637,000
Alsace-Lorraine.....	11,885,600
Hesse.....	6,238,800
Mecklenburg-Schwerin.....	3,750,800
Saxe-Weimar.....	2,047,400
Oldenburg.....	2,227,300
Brunswick.....	2,428,900
Hamburg.....	3,382,200

For the end of 1889 the total funded debt amounted to 976,502,000 marks, and to meet the extraordinary expenditure a loan of 257,007,000 marks was granted. The debt bears interest at 4 per cent., and some of it $3\frac{1}{2}$ per cent. Besides the funded there exists an unfunded debt, represented by "Reichs-Kassenscheine," or imperial treasure bills, outstanding on March 31, 1890, to the amount of 122,908,940 marks.

As a set-off against the debt of the empire there exists a variety of invested funds. These comprise (end of 1889) the fund for invalids, 475,999,024 marks, besides 3,459,450 Frankfort florins, and 329,582 silver marks; the fortification fund, 138,548 marks; and a fund for Parliament buildings, 15,704,753 marks. The war treasure fund, 120,000,000 marks, is not invested, but preserved in gold at Spandau.

GERMAN RAILWAYS, POSTS AND TELEGRAPHS.—Most of the German railways are now owned by the imperial government. Of the 25,958 miles of railway completed and open for traffic in 1889, only 3,613 miles belonged to private companies. The total length in August, 1891, was 27,000 miles. Total capital, 10,304,442,000 marks; total expenditure for the years ending in 1890, 703,916,000 marks; total receipts, 1,271,086,000.

The postal and telegraph services in Bavaria and Württemberg are retained in the hands of their respective governments; but all other parts of the empire are united to form an imperial postal district—*Reichspostgebiet*. The financial exhibit for the united postal and telegraphic services in the year ending 1890 was as follows, in marks:

	Reichspostgebiet.	Bavaria.
Receipts.....	224,722,296	19,206,679
Expenditures.....	207,003,681	16,445,066
Surplus.....	17,718,615	2,761,913
	Württemberg.	Empire.
Receipts.....	10,011,978	253,941,253
Expenditures.....	8,437,506	231,886,252
Surplus.....	1,574,473	22,055,001

In 1890 there were in the empire 52,067 English miles of telegraph lines of wire.

THE HISTORY OF GERMANY as given in the *Britannica*, Vol. X, closes with the opening of the new Imperial Parliament, Sept. 9, 1878, and the attempted assassination of the Emperor.

For many years there had been great friction between the Vatican and the Court of Berlin as to the imperial jurisdiction over German Catholic subjects. After the accession of Leo XIII. a compromise was effected in 1883 by a modification of the laws obnoxious to the Ultramontane party. The attempt to take the life of the Emperor in 1883, together with the previous attempts, gave rise to legislative measures to repress the influence of socialism. Though limited in duration the laws were renewed from time to time, often with added stringency. Prince Bismarck, however, was not content with repressive measures; he endeavored, by improving the condition of the working-classes, to cut the ground from beneath the feet of the socialistic propagandists. The acknowledgment in the Emperor's message to the Reichstag in 1881, that the working classes have a right to be considered by the state, was followed by laws compelling employers to insure their workmen in case of sickness or of accident, and by the introduction (1888) of compulsory insurance for workmen against death and old age—measures that have been by some called "state-socialism."

The energetic commercial policy of government,

also, which, since 1879, has been strongly protectionist, has its springs in similar considerations; and the recent colonial policy, which began in 1884 with the acquisition of Angra Pequena, may be considered to be stimulated partly by desire to gratify the national self-respect, and partly to provide new outlets under the German flag for the surplus population, and new markets for the home manufactures. None of the German colonies as yet, however, either in Africa or the Pacific Ocean, has proved of any great commercial value. The assembling of the Congo Congress at Berlin in 1885 fitly marked Germany's admission to the list of colonial powers. On the maintenance and improvement of the army and navy the German government has bestowed the most unremitting care, urged especially by the attitude of the "Revanche" party in France, though hitherto the imperial policy has been entirely pacific.

Considerable parliamentary friction has been caused more than once by the unwillingness of the Reichstag to vote military supplies to the amount and in the manner demanded by the Emperor and Chancellor. The latter desire to have practically a free hand in military matters, while the national parliament seeks to exercise a constitutional control over the army resembling that illustrated in Great Britain by the annual mutiny act. A compromise was effected in 1874 in virtue of which the military strength was fixed and the supplies granted for the periods of seven years at a time. In 1886 the government proposed to terminate the current *Septennat* in 1887 instead of 1888, and to immediately add largely to the peace strength of the army. On the rejection of the bill the Reichstag was dissolved (January, 1887) by the Emperor, and an appeal made to the country. The Iron Chancellor still possessed the confidence and the gratitude of the people, and the new elections in February, 1887, resulted in a crushing defeat for the opponents of the government, notably the *Freisinnige* and the Social Democrats. One of the most remarkable features of this election was a letter written by the Pope in favor of the army bill, for which he subsequently received a *quid pro quo* in a further modification of the May laws. The military septennate bill was immediately passed, and was followed in 1888 by a military organization bill, which made several changes in the conditions of service in the landwehr. The subsequent budgets show an enormous increase in the extraordinary military expenditure. While thus seeking peace by preparing for war, Germany has not failed to use diplomacy for the same end.

A personal meeting of the Emperors of Germany, Austria and Russia in 1872 was considered a proof of a political alliance (*Dreikaiserbund*); and, when Russia drifted somewhat apart from Germany in 1878, an offensive and defensive alliance was formed between Austria and Germany in 1879. Italy afterward entered this triple alliance.

The Emperor's birthday, March 22, 1887, was celebrated throughout Germany with great rejoicings. On March 9, 1888, within a year of this celebration, William I. died and the Crown Prince was proclaimed Emperor as Frederick III. After a short reign of three months the new Emperor, uncrowned, died June 15, 1888, from an affection of the throat from which he had been a sufferer for over two years. He was succeeded by his son, William II. The young Emperor at once put an imperial policy into action. His relations with the veteran Chancellor of the empire became strained to such an extent that Bismarck resigned in 1890. He was succeeded by General George Count Von Caprivi. The new regime has strengthened the triple alliance,

weakened the old bond between Germany and Russia, gained Heligoland by agreement with England, and made laws favoring the laboring man. A religious education bill warmly advocated by the Emperor was withdrawn in deference to the opposition and the bill to strengthen the peace footing of the army met with strong resistance in 1893.

GERÔME, JÉAN LEON, a French historical genre-painter, born at Vesoul in 1824. While studying at the École des Beaux-Arts, Paris, he also enjoyed the instruction of the celebrated Delaroche, with whom he went to Italy in 1844, and there exhibited his first picture, *A Cockfight*, which brought him a third-class medal. In 1863 he was made a professor of painting at the École des Beaux-Arts. Gérôme traveled in the East in 1853, and has since often gone there for subjects for his canvases. His picture entitled *The Age of Augustus* was considered worthy to be bought by the French government in 1855. Many of his works are well known through photography.

GERONIMO, an Apache Indian chief, of whose early history nothing is known. For a long time his band had been committing depredations and finally an expedition under Gen. George Crook was sent in pursuit. On March 25, 1886, terms were made with the chief and his band, who were sent to Fort Bowie, but the Indians escaped on March 29. The expedition was pronounced a failure, and upon his request to be relieved General Crook was succeeded by General Miles. Pursuit was made until the exhausted band of Geronimo was compelled to come to terms, and, after some parleying, the chief, with fourteen companions, was sent to Fort Pickens, Florida, where he still remains.

GERRY, ELBRIDGE (1744-1814), an American statesman. He entered commercial life at an early age, soon acquired a considerable fortune, and in 1773 began a public career as a member of the general court of Massachusetts Bay. In 1776 he was chosen to the Continental Congress, and signed the Declaration of Independence. He was a member of Congress till 1780, and again from 1783 to 1785. He then accepted a seat in the Massachusetts legislature, and in 1789 was elected to the first National Congress, and reelected in 1791. In 1797 he was sent on a commission to France, and from 1810 to 1812 was governor of Massachusetts. He was then elected Vice-President of the United States, and held the office at the time of his death. Many of his speeches have been published.

GERRYMANDER: in United States politics, an arbitrary apportionment of the political divisions of a State, so contrived by the dominant party as to give a larger majority to their side. The term originated in a fancied resemblance of the outline of one of the new districts of Massachusetts, formed in 1811, to a *salamander*. It was at that time thought an unfair apportionment had been made at the instigation of Gov. Gerry. Hence the term *gerrymander*.

GERSTER, ETELKA, a Hungarian singer, born at Kaschau in 1857. The director of the Conservatory of Music at Vienna happened to hear her sing once in a religious procession, and advised her to study vocal music under Madame Marchesi. Gerster enjoyed these instructions for three years. In January, 1876, she made her *début* at Venice in Verdi's *Rigoletto* with wonderful success. After this she took up the parts of *Ophelia*, *Lucia*, *Amina*, and *Marguerite*. She then went to Berlin, where she had unexampled success. In St. Petersburg and Moscow she sang before the Tzar and Tzarina, and received special favors from the latter. Returning through Germany she appeared in London in 1877 and 1878, and was afterwards twice in the

United States, where she was much applauded. Her voice is a pure soprano. Gerster was married to M. Carlo Gardini in 1877.

GESNERACEÆ, a sub-order of *Scrophulariaceæ*, including about 700 species, mostly herbs, chiefly of tropical America. They are frequently noted for the beauty of their flowers, notably *Gloxina*, *Achimenes*, and other common inmates of our greenhouses. *Fieldia Africana*, however, yields the so-called African teak.

GESSLER, the name given to the tyrannical governor in the story of William Tell.

GETTY, GEORGE WASHINGTON, an American soldier, born in 1819. He entered the army in 1840, and was appointed first-lieutenant of artillery in 1845; was made captain in 1853, major in 1863, colonel of the 37th infantry in 1866, and was transferred to the 3d artillery in 1871. He served on the northern frontier during the Canada border disturbances in 1840; in the war with Mexico in 1847-48, in Florida in 1849-50, and during the civil war with the Army of the Potomac in the Virginia peninsular campaign. He received the brevets of lieutenant-colonel, colonel, brigadier-general, and major-general, United States Army. In 1877 he commanded the troops along the Baltimore and Ohio railroad during the riot, and was retired from service in 1883.

GETTYSBURG, the county-seat of Adams county, Pa., near the southern boundary of the State. It contains 2 granite yards, and carriage manufactories. There are several educational institutions, among which are Pennsylvania College and Lutheran Theological Seminary. There is an orphan's homestead and a National cemetery. In 1863 the famous battle of July 1st, 2d, and 3d was fought in the vicinity. Pop. (1890), 3,221.

GETTYSBURG, CAMPAIGN AND BATTLE OF. The battle between the Army of the Potomac and the Confederate forces under Gen. Lee commenced about 11 A. M., July 1, 1863, and continued till the afternoon of the 3d. It resulted in the retreat of Gen. Lee, and a Confederate loss of about 26,000 men. The Union army suffered the loss of 23,187, of whom 16,543 were killed and wounded. See Britannica, Vol. XXIII, p. 780.

GEUM, a genus of *Rosaceæ*, sub-order *Potentilleæ*. Two species are common natives of Britain, *G. urbanum*, the wood avens or herb bennet, and *G. rivale*, water avens. The so-called *G. intermedium* is usually regarded as a mere hybrid of these two species. Both are aromatic, tonic, and astringent, and of old repute among herbalists; the root-stock of *G. urbanum* was formerly gathered in early spring to impart its clove-like flavor to ale, and is still used in the preparation of liqueurs. *G. Canadense*, the chocolate root or blood root of North America, has some reputation as a mild tonic.

GHARA, formed by the junction of the Sutlej and the Beas, the most easterly of the rivers of the Punjab, unites with the Chenab. The Ghara is nowhere fordable at any season, and its breadth varies from two hundred yards to five hundred.

GHENT, TREATY OF, a treaty between the United States and Great Britain, which put an end to the war of 1812-15. It was negotiated on our part by John Q. Adams, Henry Clay, Albert Gallatin, and two other envoys at Ghent; was concluded Dec. 24, 1814, and ratified Feb. 17, 1815. Its leading provisions were restoration of possessions taken by either party from the other during the war; the appointment of a commission to decide the ownership of certain islands in Passamaquoddy bay; the provision of several commissions to settle boundaries and determine the middle of water commu-

nications; and a provision binding both parties to use their best endeavors for the abolition of the slave-trade. The treaty is remarkable for the omission of reference to some important interests; particularly the impressment of seamen, which was one of the main causes of the war.

GHERARDI, BANCROFT, was born in Jackson, La., Nov. 10, 1832. He entered the navy from Massachusetts as midshipman, 1846, and served on the Ohio, of the Pacific squadron, till 1850, entering the Naval Academy in 1852. He became master and lieutenant in 1855, and at the beginning of the civil war was on the Lancaster, of the Pacific squadron. He was made lieutenant commander in 1862, and took part in the engagement with Fort Macon in that year. In 1863-64 he successively commanded the gunboat Chocorna and the steamer Port Royal, of the West Gulf blockading squadron. In the latter vessel he took part in the battle of Mobile Bay, and distinguished himself for coolness and courage. He was promoted to commander in 1866, to captain in 1874, and to commodore in 1884, and in 1885 served on the board of examiners for promotion. In 1886 he was made commandant of the Brooklyn navy yard, and in 1887 he became rear admiral. Rear Admiral Gherardi was appointed to supervise the grand review of the naval forces of the world at Hampton Roads, in April, 1893.

GIBBET, a sort of gallows on which the bodies of criminals who had been guilty of particularly atrocious crimes were by order of the courts of justice suspended after execution, encased in an iron frame near the spot where the crime was committed. This was done for the purpose of striking terror into the evil-minded, and of affording "a comfortable sight to the relations and friends of the deceased." The practice, first recognized by law in 1752, was finally abolished in 1834.

GIBBON, JOHN, an American soldier, born in 1827. He entered the army in 1847, and served till the close of the Mexican war. In 1854-57 he was assistant instructor of artillery at West Point, and was quartermaster there in 1856-59. In 1859 he became captain in the 4th artillery, chief of artillery in Gen. McDowell's division in 1861; in 1862 was made brigadier-general of volunteers, and in 1864 major-general. In 1866-69 he was colonel of the 36th infantry; and in 1869-86 of the 7th infantry. In 1886 he was promoted brigadier-general. He is the author of *The Artillerist's Manual* (1859), and has contributed extensively to current literature.

GIBBONS, JAMES, an American Roman Catholic cardinal, born in 1834. In 1861 he was ordained priest, and became assistant priest at St. Patrick's church, Baltimore, Md. A few months later he became pastor of St. Bridget's church, and then was transferred to the cathedral, and appointed chancellor of the archdiocese. In 1868 he was made vicar apostolic of North Carolina, with the rank and title of bishop, and in 1872 was translated to the vacant see of Richmond, Va. In 1877 he was appointed coadjutor to Archbishop Bailey, of Baltimore, and the same year succeeded him. In 1886 Archbishop Gibbons became a cardinal, being the second American to receive this honor. He has published *The Faith of Our Fathers* (1871).

GIBBOSITY (Lat., gibbus, "humpbacked"), a state of disease characterized by protuberance of a part of the body; chiefly applied to humpback or other distortions depending upon disease of the spinal column.

GIBBS, JOSIAH WILLARD (1790-1861), an American philologist. From 1811 to 1815 he was a tutor in Yale College, and for some years at Andover, where he devoted himself to the study of Hebrew and bib-

lical literature. From 1824 until his death he was professor of sacred literature in the theological school of Yale College.

GIBBS, OLIVER WOLCOTT, an American chemist, born in 1822. He was graduated in 1845 at the College of Physicians and Surgeons in New York, and then studied chemistry for three years in Germany. From 1849 to 1863 he was professor of physics and chemistry in the College of the City of New York, and has since been professor in Harvard University with the charge of the laboratory of the Lawrence Scientific School.

GIBSON, CHARLES HOPPER, United States Senator from Maryland, born in Queen Anne's county, Maryland, January 19, 1842. State's attorney for Talbot county, 1870-1888. Member of Congress, as a Democrat, 1885-1891. United States Senator since 1891.

GIBSON, RANDALL LEE, born in Kentucky, September, 10, 1832. Engaged in sugar planting in Louisiana. At the beginning of the civil war he enlisted as a private, and served as colonel of the 13th Louisiana infantry. Elected to Congress in 1872, he was not allowed to take his seat. Elected again in 1874, he served until 1882, when he was elected Democratic United States Senator from Louisiana; was reelected in 1888. He died in 1892.

GIBSON, WILLIAM HAMILTON, artist, was born in Sandy Hook, Conn., October 5, 1850. He has exhibited water colors since 1872, and is a member of the New York Water Color Society.

GIDDINGS, JOSHUA REED (1795-1864), an American statesman. He was admitted to the Ohio bar in 1820, and in 1826 was elected to the legislature, serving one term. In 1838 he was chosen as a Whig to Congress, and for 20 years was a member of that body. From 1861 to his death he was United States consul-general in Canada. Mr. Giddings published a volume of his speeches (1853), and wrote *The Rebellion: Its Authors and Causes*, issued posthumously (1864).

GIERS, NICHOLAS CARLOVITCH, a Russian statesman, born May 9, 1820, and educated in the Imperial Lyceum of Czarskoe-Selo. Entering the service of the ministry of foreign affairs in 1838, he filled various diplomatic missions; was ambassador to Persia 1863-69, Berne 1869-72, and Sweden 1872-75, and in 1882 became minister of foreign affairs, which position he still (1893) retains.

GIFFORD, SANDFORD ROBINSON, artist, born in Saratoga county, N. Y., in 1823, died in 1880. He was a member of the National Academy, and exhibited some landscapes at Philadelphia (1876) and Paris (1878).

GIGNOUX, FRANÇOIS REGIS (1816-82), a French landscape painter. From 1844 to 1870 he was in Brooklyn, N. Y., and in 1851 became a member of the Academy of Design, and was first president of the Brooklyn Art Academy. He returned to France in 1870, and there resided until his death.

GIGOUX, JEAN FRANÇOIS, a French painter, born at Besançon in 1806. After studying at the École des Beaux-Arts, Paris, he exhibited his first picture in 1831. His subjects are chiefly historical; as, *The Death of Cleopatra* and *The Taking of Ghent*, and religious, as *The Baptism of Christ*, and *The Last Ecstasy of St. Mary Magdalene*. He also painted portraits, and was especially successful in his decoration of churches.

GILA RIVER rises in the western part of New Mexico, in the Sierra Madre, flows generally westward, and joins the Colorado River in Yuma county, Arizona, at the southeastern extremity of California. Its total length is variously estimated at from 500 to 600 miles. Gold and silver are found near this river in Arizona, and the ruins of an an-

cient civilization abound in its lower valley. Its chief tributaries are the Rio Verde, Rio Santa Cruz, and the Rio San Pedro.

GILBERT, SIR JOHN, born in England in 1817; has exhibited pictures both in oil and water color at the leading English galleries since 1836. He is a royal academician and president of the Royal Society of Painters in Water Colors. As an illustrator of books, pictorial newspapers, and other weekly publications, his name has, for a long period, been familiar. He contributed to the *Illustrated London News* for many years. Most of the best editions of the British classics have been illustrated by him, concluding with an edition of Shakespeare.

GILBERT, JOHN THOMAS, Irish historian, born in Dublin in 1829. He was secretary of the public record office of Ireland in 1867-75; is a member of the Royal Irish Academy, its professor of archaeology, and its librarian.

GILBERT, JOSEPH HENRY, an English chemist, born at Hull in 1817, studied at Glasgow University, at University College, London, and at Giessen, Germany—at the last mentioned place under the celebrated Liebig. After taking his doctorate at Giessen he was appointed instructor in University College, London, in 1840. He conducted a course of experiments and researches in agricultural chemistry and the physiology of farm animals, the results of which have been published in a series of valuable papers.

GILBERT, WILLIAM SCHWENCK, an English dramatist, born in London in 1836. He was educated at Great Ealing School, and received the degree of B.A. from the London University in 1857. From that time to 1862 he was a clerk in the privy council office, and in 1864 he was admitted to the bar. For many years afterward he was on the editorial staff of "Fun," in whose columns his *Bab Ballads* first appeared. His stage work began with a Christmas burlesque, *Dulcamara* (1866), which was followed by a succession of dramas, burlesques, comedies, and operas. Among his fairy comedies are *The Palace of Truth*, *Pygmalion and Galatea*, *The Wicked World*, and *Broken Hearts*. Among his comedies are *Sweethearts*, and *Engaged*. His other plays include *Charity*, *Gretchen*, *Comedy and Tragedy*, etc. In 1876 appeared his comic opera, *Trial by Jury*, in which he was associated with Arthur Sullivan. In conjunction with the latter he also produced *The Sorcerer*, *H. M. S. Pinafore*, *The Pirates of Penzance*, *Patience*, *Iolanthe*, *Princess Ida*, *The Mikado*, *Ruddigore*, *The Yeomen of the Guard*, and *The Gondoliers*.

GILCHRIST, ALEXANDER, Blake's biographer, was born at Newton Green, 1828. At the age of twelve Gilchrist entered University College, London, where he formed a friendship with the Rossettis. Leaving school at sixteen, he entered the Middle Temple in 1846, and was called to the bar in 1849, but never practiced. After collecting in Yorkshire materials for a life of Etty the painter, he settled in 1853 at Guildford. The *Life of Etty*, warmly commended by Carlyle, appeared in 1855. The following year he removed to Chelsea. Here he worked upon his *Life of Blake*. Before it was completed he died, Nov. 30, 1861. His wife completed his *Life of Blake* in 1863, and issued a second edition, with memoir of her husband, in 1880.

GILDER, JEANNETTE LEONARD, journalist, born in 1849 at Flushing, L. I. Since 1881 Miss Gilder has been associated with her brother, Joseph B., in the editorship and management of "The Critic," which they established in New York city in that year.

GILDER, RICHARD WATSON, an American journalist, son of William Henry, Sr., born in 1844. In 1865 he became an editor of the Newark, N. J.,

"Advertiser," and three years later, with Newton Crane, established the Newark "Morning Register." Mr. Gilder, in 1870, accepted the associate editorship of *Scribner's Monthly* (now *The Century Magazine*). On the death of Dr. Holland, in 1881, Mr. Gilder was made editor-in-chief of *The Century*, a position which he still holds. In addition to his editorial and literary labors, Mr. Gilder takes an active interest in all public matters. He is one of the founders of the Society of American Artists, the American Copyright League, the Author's Club, and the Free Art League. He has published four volumes of poems.

GILDER, WILLIAM HENRY, an American explorer, born in 1838. At the beginning of the Civil war he enlisted in the 5th New York volunteers, and afterward was transferred to the 40th. In 1878 he went on an expedition to King William's Land in search of the relics of Sir John Franklin, and in 1881 accompanied the Rodgers expedition in search of the *Jeannette*. He has published *Schuwatka's Search* (1881); and *Ice-Pack and Tundra* (1883).

GILDERSLEEVE, BASIL LANNÉAU, an American educator, born in 1831. He graduated at Princeton College in 1849, and studied in Germany for four years. In 1856 he was chosen professor of Greek in the University of Virginia, where he remained till 1876. Since the establishment of Johns Hopkins University he has been professor of Greek there. Professor Gildersleeve for a time edited the Baltimore "American Journal of Philology," and has published six Latin text-books, and also editions of *Persius* (1875); *Justin Martyr* (1877); and the *Olympian and Pythian Odes of Pindar* (1885).

GILES, HENRY (1809-82), an American Unitarian minister. He preached for a time in Greenock, Scotland, and then three years in Liverpool, England. In 1840 he came to the United States, and soon became eminent as a lecturer. He contributed to many periodicals, and published numerous essays.

GILES, WILLIAM BRANCH (1762-1830), an American statesman. He was admitted to the bar, and practiced for several years in Petersburg, Va. In 1791 he was elected to Congress, and served continuously till 1803, except from 1799 to 1801, when he was in the Virginia Legislature. From 1804 to 1815 he was a member of the U. S. Senate, and in 1826 was again chosen to the State Legislature. The same year he was elected governor, and held that office until 1829. He published many speeches and political letters.

GILFILLAN, GEORGE, critic and essayist, was born in 1813 at Comrie, Perthshire, where his father was Secession minister. He studied at the University of Glasgow, and at the Divinity Hall of the Secession body, afterwards the United Presbyterian Church, and in 1835 was licensed to preach. In 1836 he was ordained to the School Wynd Church, Dundee, where he remained till his death, August 13, 1878. He attained considerable reputation as a lecturer and pulpit orator, and was incessantly industrious with his pen. His friends and fellow-citizens presented him with £1,000 in 1877. His works are numerous. They display a rich but reckless fancy, and wide literary sympathies, although deficient perhaps in refinement of taste.

GILL, DAVID, born in Scotland June 12, 1843, is one of the most prominent astronomers of his time. He has published numerous reports on the solar parallax, the transit of Venus and other astronomical phenomena. He is LL.D. of Aberdeen and Edinburgh, and a fellow of the Royal Society.

GILL, THEODORE NICHOLAS, an American naturalist, born in 1837. In 1863 he became an assistant in the Smithsonian Institution, and for some years

was senior assistant librarian of Congress. From 1884 to 1887 he was professor of zoölogy in the Columbian University, Washington, D. C. Besides numerous papers on scientific subjects he has published several works on zoölogy.

GILLEM, ALVAN CULLEM (1830-75), an American soldier. In 1851-52 he served against the Seminoles; was made captain in 1861; brevetted major; was chief quartermaster of the Army of the Ohio in the Tennessee campaign; was appointed colonel 10th Tennessee volunteers in 1862; commanded a brigade in 1863; was promoted brigadier-general of volunteers; and from 1863 to the end of the war served as adjutant-general of Tennessee. He was a member of the first Tennessee Legislature that was elected, and afterward commanded the cavalry in East Tennessee. In 1866 he was promoted colonel in the U. S. army; commanded the district of Mississippi in 1867-68, and then served on the Texas frontier and in California.

GILLETT, EZRA HALL (1823-75), an American author. In 1844 he was ordained pastor of the Presbyterian church in Harlem, N. Y., and in 1868 was appointed professor of political economy, ethics and history in the University of New York. He wrote much for various periodicals, and published books on religious and historical subjects.

GILLMORE, QUINCY ADAMS, an American soldier, born in 1825. He graduated at the U. S. Military Academy in 1849; was assigned to the engineers; served three years at Hampton Roads; appointed instructor at West Point, and later treasurer and quartermaster at the Academy. In 1866 he was promoted first-lieutenant in the engineering corps; was appointed captain in 1861; engineer-in-chief of the Port Royal expedition under Gen. Sherman; brevetted lieutenant-colonel U. S. army, in 1862; was assigned to important commands in Kentucky the same year; brevetted colonel in 1863; in June was given command of the Department of the South; a month later of the 10th army corps; was brevetted brigadier-general; and then made major general of volunteers. In 1864 he commanded the 10th army corps on the James River; later commanded two divisions of the 19th army corps in the defense of Washington; and in 1865 was again in command of the Department of the South. Subsequently he was appointed engineer-in-chief of the fortifications and harbor and river improvements on the Atlantic coast south of New York. In 1863 he was promoted major, in 1874 lieutenant-colonel, and in 1883 colonel. He is the author of several works on engineering, etc. He died in 1888.

GILMAN, a town of Iroquois county, Ill., on the Illinois Central Railroad, where it crosses the Toledo and Warsaw Railroad, 81 miles southwest of Chicago. It is the northeast terminus of the Gilman, Clinton and Springfield Railroad. Pop. 1,112.

GILMAN, ARTHUR, born in Massachusetts, Nov. 5, 1821, died July 11, 1882. He was educated as an architect and constructed many fine public buildings in New York and Boston.

GILMAN, ARTHUR, born in Alton, Ill., June 22, 1837. Educated in St. Louis and New York, he received an honorary degree of master of arts from Williams College. In 1870 Mr. Gilman connected himself with the "Riverside Press" at Cambridge, Mass. In 1876 he and his wife formulated a plan which afterwards developed into the "Society for the Collegiate Instruction of Women," better known as the Harvard Annex. Mr. Gilman has contributed to the periodicals and has written many books on historical and literary subjects. His most ambitious work is an edition of Chaucer, based upon the famous Ellesmere text.

GILMAN, CAROLINE HOWARD, an American authoress, wife of Samuel Gilman, born in 1794. At the age of sixteen she wrote her first poem entitled *Jephthah's Rash Vow*, and this was followed by *Jairus's Daughter*. From 1819 to 1870 she resided in Charleston, S. C., and then went to Cambridge, Mass. From 1830 to 1839 she edited "The Rose," a magazine for children.

GILMAN, DANIEL COIT, an American educator, was born in Norwich, Conn., July 6, 1831; graduated at Yale in 1852. From 1856 until 1860 he was superintendent of schools in New Haven, State superintendent of schools in Connecticut in 1865-66, librarian of Yale 1856-65, professor of physical and political geography at Sheffield Scientific School 1863-72, president of the University of California 1872-75, and since 1875 has been president of Johns Hopkins University in Baltimore, Md. He is a member of various scientific societies, and was elected president of the American Social Science Association in 1879; in 1876 he received the degree of LL. D. from Harvard, and from Columbia in 1887. President Gilman has published many magazine articles and educational reports. He is the author of a number of addresses and reports. Dr. Gilman prepared the biography of James Monroe for the "American Statesman" series, and edited the writings of Francis Lieber.

GILMER, JEREMY FRANCIS, born in Guilford county, N. C., February 23, 1818; graduated at West Point in 1839, and served in the engineer corps until 1861, when he resigned to enter the Confederate service. He became attached to the staff of Gen. Albert Sidney Johnston, was wounded at Shiloh, and assisted in the defense of Charleston and Richmond.

GILMORE, JAMES ROBERTS, better known as "Edmund Kirke," born in 1823. He became a partner in a counting-room before he was of age, and in 1848 became the head of a cotton and shipping firm in New York city, from which he retired before the beginning of the civil war. In 1862 he founded the "Continental Monthly," but soon discontinued his connection with it. In 1873 he again engaged in business, but retired in 1883, and devoted himself to literature. He has written several novels, war songs and ballads, and has done some historical work.

GILMOUR, RICHARD, born in Glasgow, Scotland, Sept. 28, 1824; came to Canada and then to Pennsylvania with his parents, and at the age of twenty joined the Roman Catholic Church. In 1852 he was ordained priest; held pastorates in Cincinnati and other cities in Ohio, and on April 14, 1872, was consecrated bishop of Cleveland. He died April 13, 1891.

GILPIN, BERNARD, "the Apostle of the North," was born of an old Westmoreland family, at Kentmere Hall, in 1517, studied at Queen's College, Oxford. In 1552 he became vicar of Norton, in the diocese of Durham, but soon resigned the living to pursue his studies at Louvain. Returning to England towards the close of Mary's reign, he was appointed by his uncle, Bishop Tunstall, to be archdeacon of Durham and rector of Easington. Here his fearless honesty against pluralities and the indolence and viciousness of the clergy soon made him many enemies, whose charges of heresy Tunstall not only set aside, but, after Gilpin had resigned both his living and the archdeaconry, appointed him to be rector of Houghton-le-Spring. His last years were troubled with infirm health, from which he was relieved by death, March 4, 1583. There is a life of Gilpin written by Bishop Carleton, one of his pupils.

GILPIN, HENRY DILWOOD, born in England, April 14, 1801; removed to Pennsylvania and practiced law in Philadelphia. He became successively

United States attorney for Pennsylvania, solicitor of the treasury, and in 1840 attorney-general of the United States. Died in Philadelphia, Jan. 29, 1860.

GILROY, a city of Santa Clara county, Cal., on the Southern Pacific Railroad, 30 miles southeast of San José, the county-seat. The city is lighted with gas, supplied with good water, and has manufactories of flour and tobacco. It is surrounded by fertile land, and farming and dairying are carried on in the vicinity. Population, 1,694.

GILTHEAD (*Chrysophrys*), a genus of "seabreams" or *Sparidae*, represented by about a score of species from the warmer seas, best known by the Mediterranean species. It is also found off the Cape of Good Hope and on East Indian and Chinese coasts. The gilthead has an oblong compressed body, a single dorsal fin with spines which can be received into a groove, scaly cheeks and gill-cover, and teeth sharp like canines in front and rounded like molars behind. The length is about a foot; the back is silvery gray, shaded with blue; the belly like polished steel; the sides have golden bands and there is a half-moon shaped spot of gold between the eyes. They feed chiefly on mollusks, in search of which they are said to stir up the sand with their tails. The fish is generally found near the shore in small shoals, and its presence is sometimes betrayed to fishermen by the noise which its teeth make in crushing shells. It was often kept in the *rinaria* by the Romans, being much valued and easily fattened.

GIMBALS (Lat., *gemellus*, "a twin"), two circular brass hoops used for suspending the compass-box on board ship, so that it may always rest horizontally, unaffected by the ship's motion. The outer hoop is attached to a box or other fixed object, while the inner is constructed so as to allow of its moving freely within the outer, to which it is attached by two pivots, at the extremities of a diameter. The compass-box is attached to the inner hoop by two similar pivots at right angles to the former. Thus the compass moves freely in two directions at right angles to each other, and can always retain its horizontal position, however the vessel may roll or pitch.

GIMP, or GYMP, a kind of trimming for dress, curtains, furniture, etc., made either of silk, wool, or cotton. Its peculiarity is that fine wire is twisted into the thin cord of which it is made. Gold and silver are used in the manufacture of military gimps.

GINGAL, a large clumsy musket used by Asiatic armies in the defense of fortresses, and sometimes mounted on carriages as a light field-gun.

GINGILIE OIL, a name often given to the bland fixed oil obtained by expression from the seeds of *Sesamum indicum*. See OILS, Britannica, Vol. XVII, p. 746.

GINGKO, a large tree of the natural order *Taxaceae*, with straight erect trunk and conical head, and leaves somewhat cloven and notched at the upper extremity, shortly stalked, leathery, smooth, shining, yellowish-green, with numerous minute parallel ribs and somewhat thickened margins. The fruit is a sort of drupe, of which the fleshy part is formed by the persistent calyx, about an inch in diameter. The nut or endocarp white, a thin shell with a farinaceous kernel, which is sold for food in China; resembles an almond in flavor, with a little mixture of sourness, which is removed by boiling or roasting. It is called the maiden-hair tree from the shape of its leaves, and is very commonly cultivated for ornament. The other members of this family are fossil, and this would probably have become extinct but for its cultivation in China and Japan.

GINSENG, a root highly esteemed in China as a medicine, being regarded as possessing the most extraordinary virtues as a remedy for almost all diseases. It is sometimes sold at exorbitant prices. See Britannica, Vol. X, p. 605.

GIOJA DEL COLLE, a commercial town of Italy, in the province of Bari, 38 miles by rail, northwest of Taranto. It is believed to have been founded in the sixth century, and very valuable Græco-Roman coins and ancient vases have been found in its neighborhood. Population, 16,573.

GIOVANNI A TEDUCCIO, SAN., a town three miles east of Naples, situated near the seashore in a fertile plain. Its neighborhood is well cultivated, and embellished with beautiful villas. Population, 11,116.

GIRARD, a city and county-seat of Crawford county, Kan., whose chief trade is with stock-raisers and farmers. Population (1890), 2,541.

GIRARD, a borough of Erie county, Pa., on the Erie and Pittsburgh and Lake Shore railroads, 15 miles southwest of Erie city. It has excellent graded schools, and some manufactories.

GIRARD COLLEGE. See COLLEGES, in these Revisions and Additions.

GIRARDIN, ÉMILE DE (1806–81), a French journalist and politician, the illegitimate son of General Alexandre de Girardin and Madame Dupuy. He was born in Switzerland in 1806, and educated in Paris. Until 1827 he bore the name of Delamothé. After 1827 he assumed the name of his father, who acknowledged him in 1847. His first attempt in literature was a novel, *Émile*, in which he pleaded the cause of illegitimate children. After the July revolution in 1830 he published the *Journal des Connaissances Utiles*, which soon attained a sale of 120,000 copies. In 1836 he founded the one cent newspaper "La Presse," an Orleanist journal with a conservative tendency. As his rivals accused him of receiving subsidies from the government he got into quarrel with Armand Carrel, editor of the "National," which culminated in a duel. Carrel was fatally wounded and died. After this Girardin occupied himself ardently with politics, both as a journalist and a deputy, and gradually became a decided Republican. When Louis Napoleon was elected to the presidency, Girardin promoted his cause; but he was strongly against the *coup d'état*, and was rewarded with a short period of exile.

In 1856 Girardin sold his share in the "Presse," but became its editor again in 1862. Soon afterwards he became the editor of "Liberté," and managed this paper till 1870. He excelled all his fellows in braggadocio on the outbreak of the Franco-Prussian war. In 1874 he founded "La France," and both in its pages and the "Petit Journal" supported the Republic. His political ideas were given to the world in a number of brochures. Girardin died April 27, 1881.

GIRNAR, a sacred mountain in India, stands in the peninsula of Kathiawar, Bombay province, 10 miles east of Junagahr. It is a bare and black rock of granite rising to the height of 3,500 feet above the sea; and, as a holy place of Jainism, is covered with ruined temples. One group contains sixteen temples, nearly 3,000 feet above the sea.

GIUDICI-EMILIANI, PAOLO, an Italian author, born at Mussomeli, in Sicily, in 1819, died at Hastings, England, in 1872. At the age of sixteen he unwillingly entered a convent, where he devoted himself to the study of literature. He subsequently quitted the convent and fled into Tuscany, where he began his principal work, *La Storia della Letteratura Italiana*. About this time he received a legacy which enabled him to pursue his studies

at leisure. He became professor in the University of Pisa in 1849, and in 1861 was made secretary to the Academy of Fine Arts in Florence. In 1867 he was elected to the Italian Parliament. Other of his writings are *Storia dei Municipii Italiani* (1851), and *Storia delle Belle Arti in Italia*.

GIULIANI, GIAMBATTISTA, an Italian writer, born at Canelli, in Piedmont, in 1818, died in 1883. He made a profound study of Dante while holding various professorships in different schools of learning, and in 1845 published his celebrated *Saggio di un Nuovo Commento della Commedia di Dante Alighieri*. He was for a time censor of the Press, and performed the duties of the office with much liberality. He published *Sul Vivente Linguaggio della Toscana*; *Le Norme di Commentare la Divina Commedia*, *Teatle dall' Epistole di Dante a Cangrande* (1856); and *Metodo di Commentare la Divina Commedia*. He also published a critical and annotated edition of all the works of Dante.

GLACIER (see Britannica, Vol. X, pp. 218-20; 626-31), a river of ice in the valley of a mountain through which it descends very slowly and steadily. Glaciers are found in the Alps, in Alaska, Greenland, etc. In the winter season snow gathers in the valleys of mountain chains in large masses;

is compacted by the pressure and partial melting of the topmost layers, and gradually changes into ice, more or less viscous, and yielding to the pushing mass above and behind it. This causes the glacial motion downhill. The thickness of these ice and snow masses varies from a few feet to thousands of feet.

The surface of glaciers is often cracked and fissured, and the waters produced by the melting of the top layers percolates through the cracks and fissures, and serves to compact the mass. The lower end of a glacier is all ice; while the upper end is mostly snow and is called *névé* in French, *firn* in German. The *névé* is often a very extensive basin—a collecting reservoir for feeding the glacier; while the other portion is narrower, resembling the bed of a river, having more or less parallel sides. A row of stones, called the "lateral moraine," marks each side of this ice river. These stones are the droppings and windings from the sides of the rocky channel. Where two glaciers combine, we find a row of stones in the middle; this stone line, called the "median moraine," marks the limits of the two confluent ice rivers. Other stones are borne along by the bottom of the glacier. They scratch, polish, and channel the rocky bed as they move onward with an irresistible force, and grind the abraded materials into small pebbles, sand, and impalpable mud. This material is borne onward both by the ice and the stream of water which flows beneath the ice.

At the lower end of the glacier a heap of stones, pebbles, and mud is deposited, called the terminal moraine. If this moraine is cut or broken through, the ice front presents a cavernous, arched vault over a stream of water. This water is muddy, being mixed with the fine abraded particles from



GLACIERS.

above. In Greenland the foot of the glaciers extends to the sea-shore and pushes out over the sea-bottom. There the glaciers cover large tracts of country, including hills and valleys, and extending over thousands of square miles. The Humboldt glacier is one of the largest. It has a sea-front of 50 miles. Where the ice is pushed out into deep water, it is lifted up by reason of its being lighter than water. This lifting action breaks off huge masses, which float on the ocean, and are known as ice-bergs. In Switzerland and the Himalayas the foot of the glacier is always on levels much higher than that of the sea, because the sun's heat is sufficient to melt the ice before it reaches the lower mountain valleys.

In the Alps there are about 1,000 glaciers, some large others small. In the Himalayas they are usually larger, some 30 to 40 miles in length. In the southernmost parts of the Andes there are also some large glaciers, which extend into the fiords of the west coast. Northward the Andean glaciers decrease in size, and cease near the equator. A few glaciers occur in the Cascade range of Oregon and Washington, one upon Mount Rainier being described as 4 to 5 miles wide and 10 miles long. In British America and Alaska the glacial ice reaches to the sea level at Mount St. Elias, which is on the boundary line between British America and Alaska. East and west of this mountain there are numerous glaciers of considerable length. There are the *Guyot*, *Tyndall*, and *Agassiz* glaciers immediately around this mountain; east of it are the *Seward*, *Morrison*, *Hayden*, *Lucia*, *Dalton*, and *Hubbard* glaciers. All of these connect with a large sea of ice, called the *Malaspina Glacier*, which fronts the Pacific Ocean between the Yakutat Bay and the Ice Bay. Besides the ones here named, there are many other extensive glaciers in Alaska.

The downward movement of a glacier is too slow to be perceptible to the eye, yet it is none the less

present, and generally continuous. J. D. Forbes found (from measurements made in the Mer de Glace, Mont Blanc, near Chamouni) and first proved that the whole sheet does not possess the same rate of motion, the center advancing more rapidly than the sides. He discovered that in summer and in the fall of the year the middle of that glacier drew forward at a rate of from 1 foot 8 inches to 2 feet 3 inches, and at the sides from 1 foot 1 inch to 1 foot 7½ inches per diem. Agassiz at about the same time carried on a series of independent experiments on the glacier of the Aar, and arrived at similar conclusions. Helland later on demonstrated that in Greenland a more rapid motion was to be found, and that the Jacobshavn glacier advanced at the rate of from 48.2 feet to 64.8 feet in the twenty-four hours. This result has lately been generally confirmed, although somewhat modified, by Dr. Rink, who, from a considerable collection of data, concludes that the quickest rate of progress of the centers of the glaciers of that region averages 21 feet in twenty-four hours. In many areas in Greenland, however, the limits of the ice sheets were found to be almost stationary, and prolonged and careful observations became necessary before any progress could be noted. In these cases the configuration of the ground was the prin-

principal cause of the more gentle motion. The variation in the rate of movement in different parts of the mass is analogous to that of rivers, and there are many other points of similarity between glaciers and streams of water which will call for notice below.

The above remarks broadly point out the general movements of glaciers, but various modifying agencies are frequently present, which change for a time the regularity of the motion. Thus, when slipping down a steep incline, the rate of progress is much more rapid than when level tracts or rising ground are being traversed. The surface of the ice-sheet, too, travels with somewhat greater velocity than the lower strata, and the nature of the glacier's bed here again produces modifications. When the path is smooth and sloping, the rates of speed at which the upper and under portions advance are much more equal than when obstacles intervene, preventing the lower strata from keeping up an equal ratio of motion with the portions nearer to and at the surface.

The glaciers which now exist are the remnants of the vast ice-sheets which covered Northern Europe and America during the glacial period. That of Europe extended south from Scandinavia over Northern Germany and a great part of the British Islands; while the Alps sent out their ice rivers hundreds of miles in advance of their present limits. In America the ice-sheet was of still greater proportions. It extended over all the Northern hemisphere as far south as the terminal moraine, which it left behind it. This southern limit is well marked. It passes through Long Island, Perth, Amboy, N. J., and Easton and Pittsburgh, Pa.; thence it runs through Ohio, touching the river east of Cincinnati, and extending for a few miles into Kentucky. From this point it passes onward through Middle Indiana and Illinois, and the States farther west as far as Dakota. Beyond this point the moraine disappears. This immense Atlantic glacier was paralleled by two smaller ones, which extended along the Pacific coast and the high ridges of the Rocky Mountains. As to the thickness of the Atlantic glacier, we find glacial markings 5,500 feet high in the White Mountains, 3,000 feet high in Southern Massachusetts and the Catskill region, and 1,000 feet high in Southern Connecticut. These indications point to a depth of 6,000 feet or more. In many other places in North America the surface of the rocks has been scraped, furrowed, and scoured by the motion of this stupendous mass of ice in a southerly direction. These parallel scratchings and furrowings of the rocks, wherever they were hard enough to resist weathering, can only be explained by glacial action. The ice, over a mile in thickness, had numerous sharp stones frozen into its bottom, and abraded the rocks by its scouring action. Where the rocks were soft or fissile they were broken into fragments and swept forward, thus forming or deepening valleys and lake bottoms. This accounts for the numerous lakes and rivers over the whole drainage area of the St. Lawrence River, Hudson's Bay, and the Arctic Ocean, as well as around the Great Lakes in the United States. They owe their existence to excavations made by ice, or are dammed back by ridges of glacial deposits.

Other indications of glacial action are certain geological deposits all over this region. The lowest of these deposits is the "unstratified boulder clay." This "drift" or "till" is a heterogeneous mixture of gravel, sand and clay, mixed with stones of all sizes. It is strewn alike over hill and dale to depths of 30 feet up to 300 feet, and rests often

on polished and striated rocks. Then there are numerous erratic boulders found scattered over the surface, and often over the tops and slopes of ridges. Some of these are small, but others are 40 feet long by 20 feet wide and high. Research in the localities of their origin shows that these boulders have often been transported, embedded in the ice, from 20 to 200 miles, and nearly always in a southerly direction.

When the intense cold of the Glacial period gradually ceased, the ice-sheet began a slow retreat northward, and dropped its accumulated matter all along its southern limits. These limits were not regular. High mountains, hills, and other local causes produced an irregular retreat. Local glaciers have therefore existed in the valleys of the White Mountains, those of the Rocky Mountains and of the Sierra Nevada. Terminal moraines mark the sites of these glaciers. One of them filled the Yosemite Valley, and passed down Merced Cañon. Others extended into the basin of Lake Tahoe. These local glaciers produce glacier striae differing from the regular southerly markings, and also transported boulders in other than southerly directions.

The great Atlantic glacier existing during the Glacial period is partially paralleled by the ice-sheet which now covers Greenland. This great island, 1,200 miles long and 400 to 500 miles wide, is covered with ice to a depth of 3,000 feet. This shows that conditions favorable to the production and maintenance of such ice-sheets may exist. As to the causes of the great cold during the Glacial period, various theories have been advanced, but the theory of Mr. Croll seems to be the most probable. He ascribes the phenomenon to the variation in eccentricity or ellipticity of the earth's orbit, and the cyclical change through which the earth passes.

GLADDEN, WASHINGTON, born in Pennsylvania, Feb. 11, 1836; graduated at Williams College, in 1859, and became a Congregational minister in Brooklyn and in Massachusetts, removing in 1883 to Columbus, Ohio, where he became pastor of the First Church. He has written much on social topics.

GLADSTONE, WILLIAM EWART, statesman, orator, and author, born in Liverpool, Dec. 29, 1809. He was the fourth son of Sir John Gladstone, a well-known Liverpool merchant and member of Parliament. Mr. Gladstone is of Scotch descent on both sides. He was educated at Eton, and at Christ Church, Oxford. In 1831 he graduated as a double first-class. As a speaker in the Oxford Union Debating Society and a writer for the Eton "Miscellany," he showed himself a strong opponent of all advanced measures of political reform—a pronounced conservative. The Conservative party were then looking out for a promising young man who could strengthen their ranks in Parliament. Gladstone stood for the burg of Newark, and was elected. In the House of Commons in 1833, the young orator made a decided impression. His manner, his voice, his diction, his fluency, were alike the subject of praise. He showed great parliamentary capacity.

In December, 1834, Sir Robert Peel appointed Gladstone to the office of junior lord of the treasury. In the year following he gave him the more important post of under-secretary for the colonies. Very soon Peel was defeated in an election and resigned as premier. Gladstone went with him. In 1841 Peel came back again to office, and Mr. Gladstone was made vice-president of the board of trade and master of the mint. He was at the same time sworn in as a member of the Privy Council. In 1843 he became president of

the board of trade, but he resigned after two years.

In 1847 Gladstone was elected M. P. for the University of Oxford, which he continued to represent for 18 years. He advocated the cause of Italian independence in many eloquent speeches. In 1858 he accepted a special mission to the Ionian Islands. At that time he published a three volume work on *Homer and the Homeric Age*. In 1859 he became chancellor of the exchequer, and in 1860 he carried through Parliament a commercial treaty with France. In 1865 he was returned for South Lancashire, and succeeded Earl Russell as leader of the House of Commons. Mr. Gladstone became prime minister in 1869. The Irish church was disestablished, the Elementary Education act was carried, and the Irish Land bill, but the government was beaten on the Irish University bill in 1873. In 1874 Gladstone resigned the leadership of the Liberal party. In 1880 he became again premier, after the defeat of the Disraeli administration at the polls. In 1885 he again resigned. After the short-lived administration of Lord Salisbury, Gladstone again came into power, and signaled his return to office by presenting his Irish Land and Home Rule bill. It was rejected on June 7, 1886. In consequence of this, Parliament was dissolved. Gladstone and his colleagues appealed to the country, but were defeated. On June 28, 1892, Parliament dissolved. The general elections returned the Liberals to power with a majority of 44, which through bye-elections was increased to 50. The new Parliament opened Aug. 4, and on the 11th a "no confidence" vote resulted in the defeat of the government. On the 12th Lord Salisbury resigned and on the 15th Mr. Gladstone presented to the Queen his cabinet list. His program included a redistribution of the seats of Parliament, a new law of franchise by which no man may cast more than one vote, however widely distributed his property may be, and the disestablishment of the church in Wales. Early in February, 1893, Mr. Gladstone presented his bill for home rule in Ireland which met with the approval of the Irish members, except those from Ulster.

GLAISHER, JAMES, meteorologist, born in London in 1809. From 1840-74 he was superintendent of the meteorological department of the Royal Observatory. Between 1862 and 1866 he made twenty-eight balloon ascents for the purpose of studying the higher strata of the atmosphere. He has written numerous works and papers on subjects relating to astronomy and meteorology.

GLASS (see Britannica, Vol. X, pp. 647-73) is now manufactured in the United States as follows:

The annual production of all kinds is about \$23,000,000. In hollow-ware articles there is very little foreign competition. The coarse greenish bottles are all made in this country. Only the fancy cologne and cut-glass castor bottles, decanters, etc., are imported, chiefly from France. Of common druggist's ware, as prescription bottles, stoppered bottles, and graduated bottles, we export largely to England, and to some extent also to France.

Of table-glass the United States produces articles fully equal to the English and French, except in a few styles. Our best grades of pressed glass-ware vary so little from the finest foreign cut glass that only experts in the trade can distinguish between them.

In window-glass (not plate) the American manufacturers command the market, except in those places where the English crown-glass and the cheapest styles of German window-glass are yet preferred. In fine plate-glass, glass for optical instruments, and Bohemian glassware, the French,

English, and German manufacturers are considerably ahead of the Americans. Yet there is something like \$2,500,000 worth of these kinds of glass produced yearly in this country.

The chief centers of the manufacture of glass in the United States are Pennsylvania, New Jersey, and New York. Of the Pennsylvania glass about 65 per cent. comes from Allegheny county, chiefly from Pittsburgh. There are also glass factories at Lenox, Mass., New Albany, Louisville, and Jeffersonville, Ind., and at Crystal City and St. Charles, Mo.

Pressed glass made by means of a lever-press is an American invention. It has enabled manufacturers to offer for common use glassware of graceful forms and beautiful designs, which formerly could only be afforded by the most wealthy.

The sandblast is now much used in carving, edging, and drilling glass. The invention of this process has added greatly to the economical uses of glass. By its means glass can be cut in any form, holes drilled in it, figures edged or carved on it in low or high relief, etc. As a consequence, plate-glass is largely introduced into our modern furniture, as for small shelves at bank-teller's desks, cashier's desks in stores, in ticket offices, in hand mirrors, as dial plates in clocks, for door panels, etc. These various new applications cause a steady increase in the manufacture of the finer qualities of plate glass in America.

GLASS-CRABS, the larval forms of rock lobsters, etc., but formerly regarded as adults, and made into a genus or even family. The body consists of two transparent leaf-like discs; there are beautiful eyes on long stalks, twenty pairs of appendages, and a small abdomen.

GLASS PAPER, or CLOTH, is made by sprinkling powdered glass over paper or calico, which is wet with a coat of glue, and to which the powdered glass adheres. Glass paper is extensively employed in polishing wood-work.

GLASS SPONGE, a name given to various silicious sponges, but particularly applied to *Hyalomma Sieboldi*, found in Japan. It is shaped like a cup, and is supported by a flexible, loosely-twisted cable of glass-like threads, which is sunk in the mud of the sea-bottom.

GLASSWORT, a genus of *Chenopodiaceae*, of which one species is common in salt-marshes in Britain. Several species grow abundantly on the shores of the Mediterranean, and as they contain a large quantity of soda were formerly of importance in making barilla, along with the species of saltwort.

GLAUX, a genus of primulaceous plants, represented by a single species, *G. maritima*. It is a little fleshy perennial, growing in saline localities in Europe, Asia, and North America.

GLEANING, the act of gathering that portion of a harvest which the reaper leaves behind. In England the custom of allowing the poor the gleanings had very nearly passed into a legal right, but the court of common pleas has decided that the public cannot claim the privilege as a right. The custom, however, still exists in England, though it is often restricted to the wives and children of the harvesters. In the United States the poor possess no right to glean, and the farmer may exclude them from his fields.

GLEDITSCHIA, a genus of leguminous trees, of which there are five or six species of North America, Northern Asia, and Africa. It is represented in the United States by the honey-locust, or three-thorned acacia (*G. triacanthos*), and by the water-locust, *G. monosperma*. The former is a large tree having compound leaves, large flat pods filled with a sweet pulp between the seeds, and inconspicuous

flowers. It is widely cultivated for shade and as a hedge-plant. The timber is hard and durable. The other North American species is a smaller tree growing in swamps in the Eastern United States.

GLEIG, GEORGE ROBERT, a British clergyman and author, born at Stirling, Scotland, in 1796, died in 1888. After being educated at Glasgow, and Balliol College, Oxford, he served under the Duke of Wellington in Spain. In 1814 he also served in America, but was wounded at the capture of Washington. Returned to England, he graduated at Oxford, and took ecclesiastical orders. He became curate of Ash in 1822, and afterwards rector of Ivy church. In 1846 he was appointed chaplain-general of the army, which office he resigned in 1875. As he interested himself very much in the education of the soldiers, he was also made inspector-general of the military schools. Gleig tells his early adventures in an amusing book, *The Subaltern* (1825).

GLENCOE, the county-seat of McLeod county, Minn., situated on Buffalo River. It has a seminary, grain elevators, and plenty of water and timber. Pop., 1,649.

GLENELG, CHARLES GRANT, BARON, born in India in 1778. Entering Parliament in 1807, he remained in public life until, while colonial secretary under Lord Melbourne, he was compelled to resign, in 1839, owing to his approval of Lord Dunham's ordinance referring to the Canadian rebels of 1838. Elevated to the peerage in 1835, he died at Cannes, April 23, 1866.

GLENS FALLS, a village of Warren county, N. Y., 9 miles south of Lake George. It has a famous cave, lime, black marble, water-power, water-works, gas-works, soldier's monument, two opera houses, a ladies' seminary, and numerous manufactures. Population (1890), 9,509.

GLENLIVET, the valley, in Banffshire, Scotland, of Livet Water, which runs 14 miles northwest, till at a point 5 miles south of Ballindalloch station, it falls after a total descent of 1,600 feet into the Avon, itself an affluent of the Spey. Its population is still largely Roman Catholic. Since 1824 its 200 whisky bothies have given place to one celebrated distillery. In 1594 Glenlivet was the scene of a battle, in which 10,000 Protestants under the Earl of Argyll were routed by the insurgents under the Earl of Huntly.

GLENROY, PARALLEL ROADS OF. The Roy is a small stream in the district of Lochaber, Inverness-shire, Scotland, having a course of about fifteen miles, and falling into the Spean at Inverroy, opposite to Ben Chlunaig. The valley through which the Roy runs has its slopes indented with three shelves, which are everywhere perfectly horizontal and parallel to each other. The granitic and metamorphic rocks, of which the mountains are composed, are covered with a greater or less thickness of angular fragments and earth, and an examination of the shelves shows that they are worn out of this soft alluvial coating. They almost invariably form a gentle slope from the hillside, and are from three to thirty feet wide. The highest, 1,139½ feet above sea-level, is easily followed along both sides of the valley to the point at which the valley narrows above Glen Glaster. The second shelf, eighty feet lower, is continued farther down until it includes Glen Glaster. The third line is 212 feet lower than the second; it may be traced round the mouth of the glen into the valley of the Spean.

GLENTILT, in North Perthshire, Scotland, the deep, narrow glen of the Tilt, which issues from Loch Tilt, runs sixteen miles southwest, and at

Blair-Athole falls into the Garry. It is traversed by the foot-path from Blair-Athole to Braemar. Glentilt is classic ground to the geologist, having furnished evidence for the Huttonian or denudation theory.

GLENWOOD, a city and the county-seat of Mills county, Iowa. Pop., 1,890.

GLENWOOD, a manufacturing and shipping town of Schuyler county, Mo.

GLIDDON, GEORGE ROBINS (1809-57), an American archaeologist. At an early age he went to Alexandria, and for twenty-three years resided in Egypt, for the greater part of the time serving as U. S. vice-consul. He then visited the United States, and lectured in the principal cities of the Union on Egyptian antiquities. He wrote several books on archaeology.

GLISSON, OLIVER S., born in Ohio in 1809; entered the United States navy in 1826, saw much active service during the civil war, and, in 1870, became rear-admiral. He died November 20, 1890.

GLOBE-FLOWER (*Trollius*), a small palaearctic genus of *Ranunculaceae*, with a globe of large showy sepals inclosing the small inconspicuous linear petals. The common yellow globe-flower (*T. Europæus*) is one of the finest ornaments of moist grounds in elevated districts of Northern Europe and in the Alps. It is cultivated in flower-gardens. The orange globe-flower (*T. Asiaticus*) is also common in gardens.

GLOBULINS, a group of proteid substances closely allied to albumen, but differing from it in that they are not soluble in water unless it contains a small proportion of a neutral salt, and that they are precipitated by carbonic acid, and (except vitellin) by a saturated solution of common salt. The most important globulins which occur in animal tissue are: globulin (proper) or crystallin, in the crystalline lens of the eye; fibrino-plastin, or paraglobulin and fibrinogen in blood, serous fluids, etc.; myosin, in muscle; vitellin, in the yolk of egg. Precisely similar bodies occur also in the vegetable kingdom.

GLOBUS HYSTERICUS, or BALL IN THE THROAT, the name applied to a peculiar sensation sometimes accompanying hysteria.

GLORIOSA, a genus of *Liliaceae*, of which the best-known species, *G. superba*, a native of India, is a herbaceous perennial with a weak stem, alternate simple leaves terminating in tendrils, and very beautiful flowers finely colored with red and yellow. The root-stock is poisonous but is washed for its starch-like manioc.

GLOSSITIS, inflammation of the tongue.

GLOUCESTER, a city and port of entry of Essex county, Mass., 28 miles northeast of Boston, situated on the south side of the peninsula of Cape Ann, and connected by railroad with the principal cities and towns of the seaboard and interior. Its interests are almost entirely commercial. It has a greater amount of tonnage employed in the domestic fisheries than any other port in the United States. Eighty per cent. of the vessels of all classes are employed in the fisheries, whose total value in 1876 was \$4,000,000. Of the ports of Massachusetts, only Boston surpasses Gloucester in foreign imports. The harbor is one of the best on the coast, and is accessible at all seasons for vessels of the largest class. Gloucester was occupied as a fishing station as early as 1624, being the first settlement made on the north shore of Massachusetts Bay. It was incorporated as a town in 1639, and became a city in 1874. Population in 1850, 7,786; 1860, 10,904; 1880, 19,329; 1890, 24,651.

GLOUCESTER CITY, a post-town of Camden county, N. J., on the Delaware River, and on the

Camden, Gloucester and Mount Ephraim Railroad, and the West Jersey Railroad, 3 miles south of Camden. It is connected by steam ferry with Philadelphia. Gingham, print-cloths and calicoes are made here. Population in 1870, 3,682; 1880, 5,247; 1890, 6,564.

GLOVERSVILLE, a city of Fulton county, N. Y., situated on the Cayadutta River. It was incorporated a city in 1890. A board of trade was organized in 1889. There are 60 miles of streets, mostly broad and paved with cedar blocks, the principal ones being traversed by horse-cars. The Fonda, Johnstown and Gloversville Railroad passes through the city, and connects with the New York Central and West Shore roads, and with the Erie Canal at Fonda. The water supply is abundant, brought by gravity from reservoirs 3 miles above the city. The fire and police departments are excellent. The assessed valuation of the city in 1890 was \$4,000,000, and no city debt. There is one national and one private bank, and a building and loan association. Two electric plants furnish lights for the streets and business houses and power for manufacturing purposes. Kasson's opera house is a fine brick building. The public schools are excellent. The Union free school building, erected in 1888, is a substantial three-story edifice. There is a free library containing 9,000 volumes, and a reading room with daily and weekly papers and magazines. There is a great variety of manufacturing carried on, and the city is particularly noted for the manufacture of buckskin and other gloves and mittens. Population in 1880, 7,133; 1890, 13,864.

GLUCOSE, STARCH or GRAPE SUGAR. The term "grape sugar" is often restricted to the solid varieties of the sugar made from cornstarch, while the liquid varieties alone are designated "starch sugar" or "glucose." The manufacture of glucose has long flourished in Europe. In 1882 there were 39 factories in Germany producing 18,000 tons of solid grape sugar and 19,000 tons of liquid glucose per annum.

In America this industry has only recently been introduced; and, in spite of the prejudice as to the healthfulness of glucose, its manufacture has spread so rapidly that there are at present over 30 factories in this country, using about 50,000 bushels of corn per day when they are running. When corn is low in price, and cane sugar, molasses, and barley are high, all the factories are in full operation. When the opposite conditions prevail all the glucose factories are idle. The McKinley tariff has lately crippled the glucose interest in our country, because it allows the low grades of sugar to be imported without duty.

Glucose is chiefly used in the manufacture of table syrups and confectionery, in the brewing of beer and ale, and the manufacture of artificial honey. Sometimes it is also used as food for bees. Brewers conceal the fact of its employment, and confectioners do not like to speak of their use of glucose. For making artificial honey, the combs are manufactured of paraffine and their cells filled with pure glucose by machinery. It looks white and inviting, but is less sweet than genuine honey. As it can be sold at less than half the price of the genuine article, and sweetened by the addition of cane sugar, a good deal of artificial honey has been manufactured. In the form of bleached grape sugar, glucose was largely mixed with table sugar before the adoption of the McKinley tariff.

In 1884 a committee of the National Academy of Sciences submitted a report on glucose, in response to a request made by the commissioner of internal revenue. Their report declared that the sweetening power of grape sugar is about two-thirds that

of cane sugar. Many experiments were made by the committee with reference to the healthfulness of glucose, it being taken internally in various conditions. In all cases it was found to be harmless and unobjectionable. The committee's report concludes that the manufacture of sugar from starch is a long-established industry, "scientifically valuable and commercially important; that the processes employed in the United States are unobjectionable and leave the product uncontaminated; that the starch sugar thus made and sent into commerce is of exceptional purity and uniformity of composition, and that, although it has less sweetening power than cane sugar, yet starch sugar is in no way inferior to cane sugar in healthfulness, there being no evidence before the committee that it has any deleterious effect upon the human system, even when taken in large quantities."

GLUE, MARINE, a cementing composition used in ship-building, for covering seams in ships' decks after being calked. In hot climates it is preferred to tar for this and other purposes, where the materials are exposed to the influence of the wet. It consists of India-rubber cut very small, and digested at a gentle heat in a closed vessel with coal-tar naphtha until it is dissolved, when powdered shellac is added, and the digestion continued until it is also dissolved.

GLUME, a term applied to certain bracts in grasses and sedges (which are sometimes conjoined as *Glumisferæ*).

GLYCOSMIS, a genus of the natural order *Aurantaceæ*, trees of the East Indies. The fruit of *G. citrifolia* is delicious.

GMEIINA, a genus of verbenaceous trees. The timber of *G. arborea* (Koombar or Goombar of Italy) resembles teak, but is closer in grain, and lighter.

GMUNDEN, a town of Upper Austria, 159 miles west of Vienna by rail. It lies 1,439 feet above sea level, amid the grandest scenery of the Salzkammergut, at the lower end of the Traunsee, or Lake Gmunden, above which towers the Traunstein. With numerous hotels and villas it is a favorite summer bathing-place. Salt mines employ many of the inhabitants. Population, 6,631.

GNEIST, RUDOLF, a German jurist, born at Berlin in 1816. He studied jurisprudence at Berlin. In 1841 he was made assessor in the superior court (*Kammergericht*), and was successively assistant judge of the same court and of the supreme tribunal, until in 1850 he resigned these positions in order to devote himself exclusively to teaching law. From 1858 to the present time, he has been a member of the Prussian Lower House; in the Imperial Parliament he has sat from the first. In 1875 he was called to the bench as a senior judge of the Supreme Court of Prussia and a member of the Privy Council. In the Prussian Chamber of Deputies, acting with the National Liberals, and in the Imperial Parliament, he has advocated a greater amount of self-government of the people, more attention to the welfare of the working classes, and reform of the judicial and penal systems, and the adoption of more liberal usages, like those in England. His writings deal chiefly with constitutional law in England and Germany, with politico-historical subjects, and with current questions of practical politics in Germany.

GOAT ISLAND, an island 70 acres in area, which divides the current of Niagara River just above its falls. It is 900 feet from the American shore, with which it is connected by a bridge.

GOAT-MOTH (*Cossus ligniperda*), a large moth common throughout Europe and Asia. It measures three inches across the wings, and has a thick heavy body. The general color is yellowish-gray;

the upper wings mottled with white and marked with black lines, the lower of a more uniform ash-color. The caterpillar when full grown is about three inches long and has a yellowish color. It inhabits and feeds on the wood of willows, poplars, and elms, often destroying the tree. It takes two or three years to attain maturity. The pupa is inclosed in a cocoon of chips cut by the jaws of the creature. The caterpillar has been regarded by some as the *Cossus* of Roman epicures, but this was more likely the larva of some large beetle.

GOAT'S BEARD (*Tragopogon*), a genus of plants of the natural order *Compositæ*. The common Goat's Beard (*T. pratensis*), also known by the name *Go-to-bed-at-noon*, is an erect biennial plant, an abundant native of Britain. The roots, if taken before the flower stems shoot up, and boiled, resembles asparagus in flavor, and are said to be nutritious. In some parts of France the fresh juice of the young stems and leaves is believed by the common people to be an excellent solvent of bile. Salsify (*T. porrifolium*), also a native of Britain, is cultivated in gardens for the sake of its esculent roots, which are esteemed by some.

GOAT'S RUE (*Galega*), a genus of plants of the natural order *Leguminosæ*, of which one herbaceous perennial species (*G. officinalis*) is sometimes cultivated like lucerne (especially in Switzerland) as a forage plant, on account of the great bulk of produce which it yields. Its peculiar smell is not relished by cattle unaccustomed to it. It was formerly employed in medicine.

GOBAT, SAMUEL, bishop of the Protestant Church at Jerusalem, born at Cremine in Switzerland in 1799, died at Jerusalem, May 12, 1879. In the Mission-house at Basle he prepared himself for the work of a missionary from 1821 to 1824. After studying Arabic and Æthiopic in Paris he entered the service of the Church Missionary Society, and was sent to Abyssinia. But as that country was in a state of war, he stopped at Cairo for three years. In 1830 he was allowed to enter Abyssinia, and soon gained the good-will of some of the prominent inhabitants. They gladly received from him an Amharic translation of the Gospels. On the renewal of the war in Abyssinia he returned to Europe. A second missionary journey, undertaken in 1835, was fruitless on account of his severe illness. In 1839 Gobat became principal of the Missionary College at Malta, where he translated the Bible into several Oriental languages.

GOBBE, or **VOANDZON** (*Voandzeia subterranea*), a leguminous annual of tropical Africa (sub-order *Cesalpineeæ*), of which the young pod is thrust into the ground in the same manner as that of *Arachis hypogæa* (the ground-nut), thus at once protecting and planting the seeds. The rich oily seeds ("Angola peas") are wholesome and agreeable when boiled. The young pods also are used like French beans.

GOBINEAU, JOSEF ARTHUR, COMTE DE, a French diplomatist and author, born at Bordeaux in 1816. His first diplomatic service was as secretary of the French legation at Berne, in 1851. He was next sent as ambassador to Persia in 1861, to Greece in 1864, to Brazil in 1869, to Sweden in 1872, and in 1877 he resigned and retired. Gobineau was very much given to study wherever he found himself. Besides his literary pursuits he was also active in various philosophic and philanthropic endeavors. He died in 1882.

GOBLET, RENÉ, born at Air-sur-la-Lys, France, Sept. 26, 1828. In 1871 he was elected to the National Assembly where he identified himself with the Republican Left. In 1879 he was appointed under secretary of state for justice; in 1882, min-

ister of the interior in M. de Freycinet's cabinet; in 1885, minister of education and public worship in the cabinet of M. Brisson; later in the same year, appointed to the same post by the new prime minister, M. de Freycinet. In December 1886, M. Goblet became prime minister. M. Goblet is a progressive Republican.

GODESBERG, a village of Rhenish Prussia, on the Rhine, four miles south of Bonn. It has a mineral spring, and a picturesque ruined castle (1213). Population, 2,901.

GODERICH, a port of entry and chief town of the county of Huron, Ont., Can., situated on Lake Huron, at the terminus of the Buffalo and Goderich division of the Grand Trunk Railway, 78 miles northwest of London. It has a good harbor, and communicates by steamer with the various lake-ports. It has eight valuable salt-wells, extensive lake fisheries, and manufactories of woollens, machinery, boots and shoes, etc. Population, 4,564.

GODDARD, ARABELLA, pianist, was born near St. Malo, in Brittany, in 1836, and received lessons from Kalkbrenner, Thalberg and Macfarren. She made her début at the grand national concerts in London in 1850, and in 1854-56 performed with great success in the principal cities of France, Germany and Italy. In 1860 she married Mr. Davison, a musical critic. She took her farewell of the British public in 1873, and then made a tour to Australia, the Sandwich Islands and the United States, returning to England in 1876.

GODFREY, THOMAS, born in Bristol, Pa., in 1704, died in Philadelphia in December, 1749. He worked as a glazier, and studied mathematics, acquiring Latin in order that he might read mathematical works in that language. In 1780 he made an improvement in Davis's quadrant, which, after considerable delay, was laid before the Royal Society of London. A similar invention was about the same time presented by John Hadley, the vice-president of the society, and both claimants being declared entitled to the honor of invention, each received a prize of £200. The instrument is called Godfrey's or Hadley's quadrant, and is still in general use.

GODKIN, EDWIN LAWRENCE, an American journalist, born in 1831. He was a correspondent of the London "News" in Turkey and Russia in 1854-56, and then came to the United States. He was admitted to the New York bar in 1859, and from 1862 to 1865 was correspondent of the "News" and an editorial writer for the New York "Times." In the latter year he became editor of "The Nation," and in 1881, when it was made the weekly issue of the "Evening Post," Mr. Godkin became an editor and proprietor of the joint publication. He wrote a *History of Hungary, A. D. 300-1850* (1856); and a work on *Government in the American Science Series* (1871).

GODMAN, JOHN D. (1794-1830), an American physician. In 1818 he graduated in medicine at the University of Maryland, and then practiced in Philadelphia. In 1821 became professor of surgery in the Medical College of Ohio, and began the publication of the Cincinnati "Western Quarterly Review." In 1822 he returned to Philadelphia, and two years later became an editor of the "Philadelphia Journal of Medical Sciences." In 1826 he was made professor of anatomy and physiology in Rutgers Medical College, New Jersey, but resigned the following year on account of failing health. He wrote many articles for various periodicals, and published several works on natural history, anatomy, and other subjects. He also made a translation of Levasseur's *Account of Lafayette's Progress Through the United States*.

GÖDÖLLÖ, a market-town of Hungary, fifteen miles northeast of Pesth, with a royal castle and park presented by the Hungarians in 1867 to their king, the emperor of Austria-Hungary. Here, April 7, 1849, the Austrian forces were defeated by the Hungarians. Population, 3,940.

GODON, SYLVANUS WILLIAM (1809-79), a United States naval officer. He was appointed midshipman in 1819, was promoted lieutenant in 1836, commander in 1855, and captain in 1861. He took part in the attack on Port Royal under Admiral DuPont; in 1863 was promoted commodore, and commanded the 4th division of Admiral Porter's fleet at both bombardments of Fort Fisher. At the close of the war he was made rear-admiral. He commanded the South Atlantic Squadron in 1866-67, and was commandant of the Brooklyn navy-yard in 1868-70. In 1871 he was retired on account of age.

GOD'S TRUCE. In the 9th and 10th centuries, when the empire of Charlemagne had begun to break into small fragments, the right of private war and private vengeance threatened to cause anarchy and dissolution instead of being a rough and ready method of enforcing equity between man and man. Accordingly, the church stepped in, and at the end of the 10th century formulated stern penalties against all who, while waging feudal war, should violate the peace. The God's Truce, technically speaking, was a mutual agreement, sanctioned by the church, on the part of the barons and nobles of a particular district, to abstain altogether from private war at certain fixed times, and to respect permanently the rights of those who followed purely pacific callings. This movement was first set on foot at a synod held at Tuluges, in Roussillon, in 1027. Fourteen years later it spread from the whole of France into Germany, Italy, Spain and England. About 1041 the main provisions of the Peace of God (*Trenga Dei*) were these: Peace was to last from Wednesday evening to Monday morning each week, also during Advent and Lent, and on certain of the principal saint's days and holy days of the church; the punishments for disobedience were money fines, banishment for a long term of years, and excommunication. The Peace of God was confirmed by several councils of the church, more especially by that of Clermont (1095), when Urban II proclaimed its universal extension throughout Christendom. During the course of the 13th century this institution fell into desuetude, its place being taken by the stronger executive of the kings.

GODWIN, PARKE, an American editor, born in 1816. He was admitted to the bar, but never practiced. From 1837 to 1853, excepting one year, he was connected with the New York "Evening Post," and in 1843 issued the "Weekly Pathfinder." He contributed largely to the "Democratic Review," and was also an editor of "Putnam's Monthly." In 1865 he again became connected with the "Evening Post." He wrote *Popular View of the Doctrines of Charles Fourier* (1844); *Construction Democracy; Yala, a Mythological Tale* (1851); *A Handbook of Universal Biography* (1851); *History of France* (1861); *Out of the Past* (1871), and an edition of Bryant's writings, with a life (1883-84).

GOETTLING, KARL WILHELM, German philologist and historian, born at Jena in 1793, died Jan. 20, 1869. He was educated at Jena and at Berlin; in 1815 became professor in the gymnasium at Rudolstadt, in 1819 director of the gymnasium at Neuwied; in 1822 professor extraordinary, and in 1832 professor in the University of Jena. He visited Italy, Sicily, and Greece in connection with his archaeological and historical studies.

GOFF, NATHAN, born in Clarksburg, W. Va., Oct. 9, 1843. Educated at the University of New York in 1861 he entered the U. S. army and in 1863 was appointed major of the 4th Virginia cavalry. Serving a term in the West Virginia Legislature and acting as district attorney from 1868 to 1881, he resigned the latter office to accept the secretaryship of the navy, vacated by Richard W. Thompson. Mr. Goff was a member of Congress, as a Republican, 1884-1888, and in 1892 was appointed judge of the Circuit Court of Appeals.

GOFFE, WILLIAM (1605-79). In 1647 he joined the army, and in 1655 became a major-general. In 1654 and 1656 he was sent to Parliament, and Cromwell appointed him to a seat in his House of Lords. He was one of the judges who signed the death-warrant of King Charles I. Before the restoration of Charles II., Gen. Goffe and Gen. Edward Whalen arrived in Boston, and when the king offered a liberal reward for their arrest they were compelled to conceal themselves. In 1675 Goffe suddenly put himself at the head of the citizens of New Haven who were attacked by Indians. He led them to victory, and disappeared as quickly as he had come.

GOFFSTOWN, a manufacturing village of Hillsborough county, N. H. Population, 1,981.

GOHANUH, a town of India, in the Bengal presidency, 50 miles from Delhi. Population, 6,668.

GOLCONDA, the county-seat of Pope county, Ill., on the Ohio River. Farming, mining, and manufacturing are the chief occupations of the vicinity. There are several mills and a lead and a kaolin mine. Population, 1,174.

GOLD (see *Britannica*, Vol. X, pp. 740-53) is the most ductile and malleable metal, almost as soft as lead, and on account of its brightness, scarcity, beautiful yellow color, and the facility with which it can be wrought into ornaments, has always been held in the highest estimation by mankind. In its native state we find it mostly in small grains, fibers and scales, seldom in irregular lumps, called nuggets. It is sparsely disseminated through various rocks, as granite, shale, etc.; but is most abundantly found in quartz veins, which penetrate these rocks, and in beds of quartz sand and quartz pebbles. Solid gold veins are never met with. The grains of gold are embedded in the quartz rocks, except where the latter have been disintegrated. We find it most abundantly where iron pyrites prevail. It is well known that the waters of the ocean contain also gold; but the quantity is too insignificant to pay for its separation. It amounts to about one grain of gold to every ton of water, or a dollar's worth of gold for 25 tons.

Gold can only be mined where it has accumulated in fissure veins, or at the bottom of placer deposits near the bedrocks. On account of its great specific gravity, which is 19, it settles to the bottoms of the gravel beds, and is most concentrated upon their bedrocks. There its yellow glistening luster early attracted the attention of man. Until about 40 years ago, all the gold in circulation was extracted by washing the gravel, sand, and earth of placers. *Quartz-mining*, crushing and stamping the gold quartz and amalgamating the gold out of the quartz powder, is a recent invention. It began in California about 1860.

Placer-mining is principally carried on in California, Australia, on the Siberian slope of the Ural Mountains, in Georgia and North Carolina, and in some of the South American States. *Hydraulic-mining* is a Californian invention. In this mode of mining, streams of water issuing from nozzles are thrown against banks of earth containing gold, and the earth thus disintegrated is washed into sluices where the gold particles are caught. Noz-

zles have been used as large as six to eight inches in diameter; and water under heads of 200 to 300 feet has been thrown by these nozzles. Such streams have an incredible power. If we try to strike a crowbar or an ax through the stream a few feet from the nozzle, we find it impossible to do so, as the stream behaves like a solid bar of iron. If a man is hit by such a stream, even at 20 or more feet from the nozzle, he will be instantly pounded into a shapeless mass. It will throw boulders of 1,000 pounds weight to a distance of 200 feet, as boys throw balls. With such streams directed against a bank of dirt and gravel, the bank is very soon hollowed out by the water and made to cave in. Whole hills have been washed down in this way.

In Nevada, where water is very scarce, people are anxious to find a way of extracting the gold particles contained in the loose dirt on the hills without the use of water. It has often been tried by a winnowing process. Blasts of air have been driven through the dry dirt, and the heavier gold made to settle down, while the sand and dirt particles were blown away. Although gold was obtained by this method, yet it could never be made to pay.

Quartz-mining is carried on in the same countries where placer mining is done. In some cases, as, for instance, in the mines of the Forbes Reef Mining Company, in Transvaal, South Africa, the drilling of the blast holes is accomplished by drills worked with electric motors. Dynamos are driven by a water-fall situated five miles away, and the electric current is brought to the mines by wires stretched on posts. In the Comstock and other mines around the Sutro Tunnel, Virginia City, Nev., the stamps used for crushing the ore containing gold and silver are also worked by several electric motors. A great fall of water at the end of the Sutro Tunnel drives a number of water wheels; and these, in their turn, drive several dynamos, the currents from which are conducted by wires to the electric motors at the stamp mills.

For amalgamating the ground ore an apparatus similar to the Hungarian mill is used. But recently the "hydrogen amalgam process" of extracting gold from ground ore and tailings has been introduced. It consists in placing the mercury in a pan having a flat disk floating on the mercury. This surrounds a porous pot. The ground ore, with water, is fed in between the porous pot and the disk. A circular motion is given to the disk, so as to spread the ore through the mercury. In the porous pot there is a solution of sodium sulphate. An electric current is passed into the apparatus, the quicksilver being made the cathode. This current develops hydrogen over the quicksilver, and this hydrogen cures its tendency to "sicken;" that is, to oxidize and become ineffective. It is claimed that 40 per cent. more gold can be extracted from the ore by this process than by the ordinary way of amalgamating, and that the waste of quicksilver is prevented.

The yearly product of the gold mines in the United States averages about \$40,000,000; and that of the entire world is not far from \$100,000,000 at this time.

GOLDAU, formerly a small town of Switzerland, in the canton of Schwyz, memorable for its destruction by a stupendous landslide, Sept. 2, 1806. In a few minutes not only Goldau, but the neighboring villages of Busingen, Röthen and Lowerz were overwhelmed, and a part of the Lake of Lowerz was filled up, by the fall of the upper slope of Mount Rossberg. The valley is now a wild, rocky waste, overgrown with grass and moss. The village of New Goldau, on the line of the Rigi railway, consists of but a few houses.

GOLD-BEATER'S SKIN, a very thin but tough membrane placed between the layers of gold during the process of beating. It is prepared from the great intestine of the ox (see *Britannica*, Vol. X, p. 753), and besides its application in gold-beating is used in the dressing of slight wounds.

GOLDEN, the county-seat of Jefferson county, Col., containing a college, State school of mines, flour and paper mills, smelting-works, foundry and coal mines. Population (1890), 2,383.

GOLDEN BEETLE, the name popularly given to many members of a genus of coleopterous insects, *Chrysomela* and of a sub-family, *Chrysomelidae*, belonging to the tetramerous section of the order. The body is generally short and convex, the antennae simple and wide apart at the base. None of the species are of large size, but many are distinguished by their metallic splendor of color. The finest species are tropical. See *Britannica*, Vol. VI, p. 134; and Vol. XIII, pp. 149-50.

GOLDEN-EYE FLY (*Chrysopa perla*), also called lacewing fly, a neuropterous insect of a pale green color, with long thread-like antennae, long gauze-like wings, and brilliant golden eyes. Its flight is feeble. The length from the tip of the antennae to the tip of the wings, is almost an inch and a half, but the insect without wings and antennae is not more than one-third of this. The eggs have been mistaken for fungi. The larvae, called aphidions, are useful in destroying aphides. The pupa is inclosed in a white silken cocoon, from which the fly is liberated by a lid.

GOLDEN-ROD (*Solidago*), a genus of plants of the natural order *Compositae*, closely allied to *Aster*. Only the *S. Virga-aurea* is British, but more than 100 species belong to North America, where their bright coloring lightens up the beautiful autumnal scenery. *S. Virga-aurea* had at one time a great reputation as a vulnerary, whence probably the name (from Lat. *solidare*, "to unite"). The leaves of this and a fragrant North American species, *S. odora*, have been used as a substitute for tea. They are mildly astringent and tonic.

GOLD-EYE, or MOON-EYE (*Hyodon tergisus*), a peculiar fish, abundant in the western rivers and lakes of North America. It has many technically interesting peculiarities of structure, and forms a family by itself in the Physostomi order of bony fishes. It measures about a foot in length.

GOLD HILL, a town of Nevada, 7,000 feet above the sea, and a mile south of Virginia City, with rich silver mines, and quartz-mills. Here, on Mount Davidson, is the famous Comstock Lode. Pop., 4,531.

GOLD OF PLEASURE, or FALSE FLAX, the *Camelina sativa*, an annual plant of the order *Cruciferae*, growing in Europe, and sparingly in the United States. Its fibers can be used for the manufacture of coarse fabrics, and it is sometime cultivated for the oil of its seeds.

GOLDSBORO, a city and county-seat of Wayne county, N. C. It is a railroad center, is on the great Southern thoroughfare of travel, has a female college, and a population of 4,017.

GOLDSBOROUGH, LOUIS MALESHERBES (1805-78), a U. S. naval officer. He entered the navy as midshipman at seven years of age and at twenty was appointed lieutenant. In 1827 he received the thanks of the English government for the rescue of the brig *Comet*, which had been captured by Greek pirates. During the Seminole war he commanded a company of volunteer cavalry, and in 1847 was executive officer of the frigate *Ohio*, which bombarded Vera Cruz. In 1849 he was senior member of the commission to explore California and Oregon, and in 1853-57 was superintendent of the U. S. Naval Academy. In 1861 he became flag-

officer, and was placed in command of the *Minnesota*. He was made rear-admiral in 1862, and in 1865 commanded the European squadron. In 1873 he was placed on the retired list, after a longer service and more active duty than any other naval officer then living. He died February 20, 1878.

GOLDSCHMIDT, MADAME JENNY MARIA LIND, a celebrated Swedish singer, born at Stockholm, Oct. 6, 1820, died near Malvern, England, Nov. 2, 1887. Her father was a teacher of languages. When only three years old, she could sing any piece she had ever heard. At nine she was admitted to the singing school attached to the court theater. Soon afterwards she played juvenile parts on the stage, showing considerable dramatic ability. At eighteen she appeared in the role of Agatha in *Der Freischütz*, Alice in *Robert le Diable*, etc., and soon became the prima donna of the Royal Theater, Stockholm. In 1841 she went to Paris to receive lessons from Garcia, who did not encourage her at first. But Meyerbeer, who heard her once, prophesied a brilliant future for the young singer. Jenny's voice was thought to be wanting in volume, and when she appeared at the Grand Opera two years later, her failure discouraged her so that she resolved never again to sing in France.

In 1844 she went to Berlin, where she studied German. Returning to her native city, Jenny was heard with enthusiasm in *Robert le Diable*. Upon Meyerbeer's recommendation she was engaged at Berlin in October, appearing in *Norma*, and Meyerbeer's operas. In 1846 she visited Vienna; in 1847 London. Prices at her Majesty's theater rose to a fabulous height, and "the town," says Chorley, "sacred and profane went mad about the Swedish Nightingale." She selected the part of Alice, which had first shown the sweetness of her voice. Her soprano voice was at that time very thrilling and sympathetic. She warbled like a bird. On May 18, 1849, she sang on the London stage for the last time in *Roberto*. After that her appearances were confined to the concert-halls.

In September, 1850, she came to America under the auspices of P. T. Barnum. Her share of the profits of a brilliant tour in this country amounting to \$300,000, she afterwards spent in founding and endowing musical scholarships and charities in Sweden and England. Her first concert in New York was accompanied by scenes of the wildest enthusiasm. The seats were sold at auction, and hundreds of dollars bid for the best choice. After giving about one hundred concerts in the principal American cities, she married, at Boston, Mass., Otto Goldschmidt, who had accompanied her as pianist. Returning to Europe she continued to sing at concerts and in oratorios, as in London (1856), and for the last time at Düsseldorf in 1870. Her English charities included the gift of a hospital to Liverpool, and of a wing of another to London. Her voice retained its sweetness to the last, but she only sang occasionally in London drawing-rooms, except at the Royal College of Music, where she was professor of singing from 1883 till 1886. Jenny Lind's moral character was pure and elevated, and her feelings deeply religious.

GOLD STICK, a title given in England to the captain of the Gentlemen-at-Arms, and to the colonel of the Life Guards, who bear gilded rods on occasions of state.

GOLD-THREAD, the popular name in America for *Coptis trifolia*, a ranunculaceous plant, found from Denmark to Siberia, and over the North American continent through Canada into the United States. It is a small creeping plant, the leaves somewhat like those of the strawberry, but

smaller, and evergreen under the snow. The flowers are small and white. The name "gold-thread" is given to the abundant silk-like root-stocks which the plant produces. It was a popular remedy with the Indians of the Northern United States and Canada for sore mouths and ulcerated throats. The French Canadians use it often for these maladies, little bundles of the roots being often sold in the French markets of Montreal under the name of *Tissa voyanne jaune*. The Indians made a dye from the stems and leaves, by which they colored skins of animals a saffron yellow.

GOLFO DULCE, a lake of Central America, in Guatemala, forming the principal water-way of that State to the Atlantic. It is 25 miles long, 10 miles broad, and communicates with the Gulf of Honduras by a small stream. The entrance into the river is impeded by a bar, but the river itself and the lake have considerable depth.

GOLIAD, the capital of Goliad county, Texas, situated on the north bank of the San Antonio River, about 90 miles southeast of the city of San Antonio. It is the seat of Aransas College. It has a salubrious climate, and is surrounded by rich lands. Pop. (1890), 2,000.

GOLIATH BEETLE, an immense cetonian lamellicorn beetle of the genus *Goliathus*. *G. giganteus*, one of the largest of known coleopters, is about four inches long and two inches broad. Some of these insects are very handsome. The species is African but some related genera occurring in tropical Asia are also called goliath beetles.

GOLOMYNKA (*Comephorus* or *Callionymus baikalensis*), a remarkable fish, found only in Lake Baikal, the only known species of its genus, which comes near the gobies, but is the type of a distinct family. It is about a foot long, is destitute of scales, and is very soft, its whole substance abounding in oil, which is obtained from it by pressure. It may be almost said to melt into oil on the application of fire. It is never eaten.

GONAIVES, a seaport of Hayti, on a beautiful bay on the west coast, with an excellent harbor, 65 miles north-northwest of Port-au-Prince. It exports coffee, cotton, logwood, and hides. Population (1887), 18,000.

GONIATITES, a genus of fossil cephalopodous mollusca, belonging to the same family as the ammonites. The septa are lobed, but without lateral denticulations, as in ammonites. The siphonal portion is shorter than the sides, forming a sinus at the back, as in the *Nautilus*. The last chamber, tenanted by the animal occupies a whole whorl, and has a lateral expansion. The shells are small. This genus is confined to the Paleozoic strata; nearly two hundred species have been described from the Devonian, Carboniferous, and Triassic systems.

GONFALON (Ital. *gonfalone*), or GONFANON, an ensign or standard, in virtue of bearing which the chief magistrates in many of the Italian cities were known as *gonfalonieri*, standard-bearers of the church.

GONZALES, the county-seat of Gonzales county, Texas, on Guadalupe River, and one of the oldest towns of the State. It is the seat of Guadalupe College. Pop., 1,641.

GONZALEZ, MANUEL, born in Mexico in 1820; became a guerrilla leader in 1853, and was prominent in the reactionary party. In 1861-65 he assisted Juarez against the French and Imperialists, and in 1876 joined with Diaz to overthrow Lerdo de Tejada. In 1878 he became secretary of war under Diaz, whom, in November, 1880, he succeeded as president. This office he held four years, and afterward became governor of the State. Died April, 1893.

GOODALE, GEORGE LINCOLN, botanist, born in Saco, Me., August 3, 1839; graduated at Amherst, and in medicine at Harvard and Bowdoin. He held professorial chairs at Harvard and other institutions, and is a member of the council of Harvard College library and of the museum of comparative anatomy. He has written several works on botany and vegetable histology.

GOODALL, FREDERICK, artist, was born in London, England, in 1820; became A.R.A. in 1852, and R.A. in 1863. He is best known by his historical paintings and works of genre.

GOODE, GEORGE BROWN, an American ichthyologist, born at New Albany, Ind., Feb. 13, 1857; became a member of the staff of the Smithsonian Institution and from 1874 to 1887 was chief of the division of fisheries. He has been a member of many important commissions and in 1887 became fish commissioner. He is now assistant secretary of the Smithsonian Institution, in charge of the National Museum. He has written much on ichthyology.

GOODELL, WILLIAM (1792-1867), an American missionary. He graduated at Andover Theological Seminary in 1820, and two years later sailed for the Island of Malta. In 1823 he went to Beirut, and in 1831 to Constantinople. He endured many hardships, and during his twenty-nine years of missionary life, was compelled to change his residence thirty-three times. He returned to the United States in 1865. In 1843 he completed a translation of the Scriptures from the original Greek and Hebrew into Armeno-Turkish, and later contributed papers to the New York "Observer," entitled *Reminiscences of the Missionary's Early Life*.

GOODRICH, CHAUNCEY ALLEN, an American lexicographer, born in New Haven, Conn., Oct. 23, 1790, died there Feb. 25, 1860. He was a tutor in Yale College from 1812 to 1814; was pastor of the Middletown, Conn., Congregational Church in 1816-17; professor of rhetoric and oratory in Yale from 1817 to 1839; and professor of pastoral theology until his death. He contributed extensively to various periodicals, and in 1829 established the "Christian Quarterly Spectator," being its sole editor from 1836 to 1839. Besides some educational works, he edited Webster's *Unabridged Dictionary* and *Select British Eloquence*.

GOODRICH, SAMUEL GRISWOLD, an American author, best known by his pen-name, PETER PARLEY, was born in Ridgefield, Conn., August, 19, 1793, and edited in Boston an annual called *The Token*, from 1828 to 1842, to which he contributed poems, tales and essays, and in which the best of Hawthorne's *Twice-told Tales* first appeared. He published some two hundred volumes, mostly for the young, and dealing with history, geography, travels and natural history. Many of his books were reprinted, and became popular in Great Britain. He died May 9, 1860.

GOODWIN SANDS, famous sandbanks stretching about ten miles in a northeast and southwest direction at an average distance of five and a half miles from the east coast of Kent, England. Large, level patches of sand are left dry when the tide recedes, and afford a firm foothold, but when covered the sands are shifting, and may be moved by the prevailing tide to such an extent as to considerably change the form of the shoal. These sands have always been dangerous to vessels passing through the Strait of Dover, though an admirable system of lightships and buoys has robbed them of much of their danger.

GOODWIN, WILLIAM WATSON, an American scholar, born in 1831. He was a tutor at Harvard from 1856 to 1860, when he became professor of

Greek literature. He is a member of several scientific and historical societies, and has contributed to various literary and philological journals. He is the author of several works on philology and grammatical science.

GOODYEAR, CHARLES (1800-60), an American inventor. At the age of twenty-one he became a member of the firm of A. Goodyear & Sons, manufacturers of steel hay-forks; but in 1830, through the failure of Southern houses, the firm was compelled to suspend. From that time until his death Mr. Goodyear was engaged in experimenting with India rubber. In 1844 he obtained his patent for vulcanized rubber, and he lived to see his material applied to nearly 500 uses, and to give employment to more than 60,000 persons.

GOOKIN, DANIEL (1612-87), an American soldier. He came to Virginia in 1821, and in 1844 removed to Cambridge, Mass. He was appointed a captain of the militia and a member of the house of deputies; was speaker of the house in 1651; was chosen magistrate in 1652; and in 1656 was appointed superintendent of all the Indians acknowledging the government of Massachusetts, retaining the office until his death. In 1681 he became major-general of the colony. He wrote *Historical Collections of the Indians of Massachusetts* (published posthumously); and a *History of New England*, which was lost and never published.

GOOSE. See *Britannica*, Vol. X, pp. 777-79.

GOOSEBERRY. See *Britannica*, Vol. X, pp. 779-80.

GOOSE LAKE lies partly in Jackson county, Oreg., and partly in Siskiyou county, Cal. It is 30 miles long and 10 miles wide, and at the southern end has an outlet called Pitt River.

GOPHER WOOD. The probable identity of the gopher wood of Scripture with the cypress is maintained partly on account of the qualities of the wood and partly on account of the agreement of the radical consonants of the names.

GORAL, a kind of goat antelope, *Nemorhædus goral*, inhabiting the rocky heights and lofty tablelands of India. It is of a grayish-brown color, dotted with black, the cheeks and throat white; the horns are short, inclined, recurved, and pointed. It is a wild and fleet animal, hunted for its excellent flesh.

GORDON, CHARLES GEORGE, a British general, best known as "Gordon Pasha," born at Woolwich in 1833, died in 1885. In 1847 he entered the military academy at Woolwich, and in 1852 the Royal Engineers. At Sebastopol, where he fought in the trenches, he was slightly wounded. Subsequently he was engaged in surveying the new frontier between Turkey and Russia in Europe and Asia. In 1860 Gordon went to China, and took part in the capture of Peking and the destruction of the summer palace there. In 1863 he was appointed to the command of a Chinese force officered by Europeans and Americans, and was for two years engaged against the Taiping rebels. He fought 33 actions in two campaigns, took numerous walled towns, and crushed the formidable rebellion which had so long wasted the fairest provinces of China.

Returning from China in 1865, "as poor as when he had entered it," he performed engineer duties at Gravesend till 1872, when he went to Bulgaria as commissioner. In 1873 Khedive Ismail of Egypt employed him to open up the regions of the equatorial Nile and the lakes which recent explorations had discovered, a work formerly begun by Sir Samuel Baker. Gordon was appointed governor of the equatorial provinces, and in February, 1874, he marched with 2,000 Egyptian and negro troops to Gondokoro, on the White Nile. Here he established

a chain of fortified posts as far as the great equatorial lakes. He aimed at the suppression of the slave-trade which had formerly been the one great object of Soudanese commerce. The Khedive supported his efforts, raised him to the rank of pasha, and made him governor of all Soudan in 1877.

In 1879, when the new Khedive, Tewfik, failed to support him, Gordon resigned his position and returned to England, where he was greeted with great enthusiasm. After a brief holiday in Switzerland he was sent to Mauritius as commanding royal engineer. Afterwards he was appointed major-general, and had command of the British troops in Cape Colony till 1882. Early in 1884 the British government asked him to proceed once more to the Soudan, where the Moslem populations had risen in revolt, and defeated the Egyptian armies and isolated the Egyptian garrisons. A month after Gordon reached Khartum, this place was invested by the troops of the Mahdi, the leader of the Soudanese revolt. A relief expedition was organized in England, but reached the Soudan too late. The town of Khartum had been taken by the Mahdi two days before the expedition arrived. Gordon had fallen after a brave resistance of many months. The journal he left behind reveals wonderful courage, faith, resolution, and humility—a true Christian hero. He was treacherously slain by an Arab.

GORDON, JOHN B., United States Senator from Georgia, a lawyer, born in Upson county, Ga., Feb. 6, 1832. He was educated at the University of Virginia, served in the Confederate army, being promoted from captain up to major-general, and was eight times wounded in battle. In politics a Democrat, he was a Presidential elector in 1868 and 1872, and a delegate to the National Democratic conventions of those years. In 1872 was elected by the State legislature to the United States Senate to succeed Joshua Hill. He resigned in 1880, became State railroad commissioner, and was governor of Georgia from 1886 to 1890. In 1890 he was elected to the United States Senate to succeed Joseph E. Brown, and was re-elected in 1891.

GORDON, SIR ARTHUR HAMILTON, a British colonial governor, born at Aberdeen in 1829. After graduating at Cambridge University, he served as private secretary to his father, the fourth earl of Aberdeen, who was minister 1852 to 1855. In 1854 Sir Arthur became a member of Parliament for Beverly. In 1858 he was attached to Mr. Gladstone's mission to the Ionian Islands. Since 1861 Sir Arthur has been governor of New Brunswick, Trinidad, Mauritius, and of the Fiji Islands (1875), then just made into a British colony. In 1880 he was made governor of New Zealand, and governor of Ceylon in 1883. He displayed great administrative abilities in all these positions.

GORDONIA, a genus of plants of the natural order Ternstroemiaceæ. *G. Lasianthus*, the Lobloily Bay, which cover considerable tracts of swampy coast in the Gulf of Mexico, is a handsome tree (fifty to sixty feet), with evergreen leaves, and large white fragrant flowers. The bark is used in tanning.

GORDONSVILLE, a village of Orange county, Va., on the Chesapeake and Ohio Railroad, at its junction with the Virginia Midland and Great Southern Railroad, 87 miles southwest of Washington, D. C. Pop., 962.

GORGEI, ARTHUR, the commander-in-chief of the Hungarian forces during the revolt of 1849, born in 1818. In 1848 he distinguished himself by compelling Jellachich's Croatian reserve of 10,000 men to capitulate to him. In March, 1849, he was made commander-in-chief. In August he was nomi-

nated dictator in Kossuth's stead, and shortly afterward surrendered his army of 24,000 men, the last of the Hungarian forces in the field, to the Russian commander. Gorgei himself was imprisoned for some time at Klagenfurt, in Carinthia, but eventually set at liberty. In 1868 he returned to Hungary, and in 1884 was presented with an address by 260 of his old companions in arms.

GORGES, SIR FERDINANDO (1665-1647), a proprietor of Maine. During the war with Spain he served in the English army, and in 1604 became governor of Plymouth. He then became interested in the colonization of the New World, and formed a company for that purpose. After several unsuccessful attempts at settlement the council resigned its charter, and in 1639 Gorges obtained a new charter, which constituted him lord-proprietary of the province of Maine. He divided it into two counties, and these were further divided into hundreds and parishes. In 1840 he sent his nephew, Thomas Gorges, to Maine as deputy-governor. Sir Ferdinando died at an advanced age, and his territorial rights had been more a source of expense than of profit.

GORGONIA, a genus of corals of the Alcyonarian type, in which the colony of polypes forms a branched but flattened growth, supported by an internal axis of horn (*cornein*), originally derived from the bases of the polypes. The genus, which includes over a score of widely distributed species, is nearly allied to the black coral (*Plexaura antipathes* of the Red Sea and Indian Ocean), from whose black horny axis ornaments are often made; and to the sea-fan (*Rhipidogorgia flabellum*), whose much-branched fan-like skeleton is often brought as a curiosity from the West Indies.

GORHAM, a village of Coös county, N. H., situated on the Androscoggin River and on the Grand Trunk Railroad, 91 miles northwest of Portland, and about ten miles northeast of Mount Washington. It has fine scenery, and is a favorite place of summer resort. Pop., 1,710.

GORY DEW, a dark-red slimy film, sometimes seen on damp walls and in shady places. Its appearance on the whitewashed walls of damp cellars, etc., is apt to occasion alarm from its resemblance to blood. It is one of the lowest forms of vegetable life—an alga of the group *Palmellaceæ*, and allied to the plant to which the phenomenon of red snow is due. Its botanical name is *Porphyridium cruentum* (*Palmella cruenta*).

GORTON, SAMUEL, founder of the sect of Gortonians or Nothingarians, born at Gorton, England, about 1600, died in Rhode Island in 1677. He was for a time employed by a linen-draper of London, but in 1636 sought religious freedom in Boston, Mass. Becoming involved in disputes, he removed to Plymouth, was accused of heresy and expelled from the colony; went with a few followers to Aquidneck (now Newport), R. I., and was there publicly whipped for treating the magistrates with contempt. He then settled at Pawtuxet, R. I., but again became involved in disputes with the colonists, and in 1642 removed to Shawomet (now Warwick), R. I., where he purchased land of the Indians. His claim to the property was contested; he and his ten followers were taken to Boston, tried as heretics, and sentenced to imprisonment and hard labor, but the sentence was afterwards commuted to banishment. Gorton then went to England, procured an order giving him possession of the lands at Shawomet, returned there, and subsequently became a preacher and magistrate of much consideration. His sect survived him for nearly one hundred years. He published several religious works.

GORTSCHAKOFF, PRINCE ALEXANDER MICHAEL-OVITCH (1798-1883), a Russian statesman. In 1854-56 he was ambassador at Vienna, and then became minister of foreign affairs. In 1863 he was appointed chancellor of the empire, and from this time until the ascendancy of Bismarck he was the most powerful minister in Europe. In 1882 he retired from public life and went to Baden-Baden, where he died.

GOSCHEN, GEORGE JOACHIM, an English statesman, born in 1831. In 1863 he entered Parliament, as a Liberal, for the city of London, and in 1866 he entered the cabinet; in 1868 he became president of the poor-law board, and in 1871 head of the admiralty, holding the latter post until 1874. In 1878 he represented Great Britain at the international monetary conference held at Paris. In 1887 he took his seat as a Liberal-Unionist and accepted the chancellorship of the exchequer, which he resigned in 1892. In 1890 his budget proposals in connection with licensing were warmly opposed by the Liberals.

GOSHEN, a city and county-seat of Elkhart county, Ind., midway between Chicago and Toledo. Elkhart River furnishes abundant water-power, and great quantities of lumber are manufactured here. There are flour mills, a woolen mill, oil mill, and plow factories. Pop. (1890), 6,033.

GOSHEN, a railroad junction, and one of the county-seats of Orange county, N. Y. Dairying is the chief business. Pop., 2,907.

GOSNOLD, BARTHOLOMEW, an English navigator, who first became known as an associate of Raleigh in his unsuccessful attempt to found a colony in Virginia. In 1602 he sailed from England with one ship and twenty colonists; steered directly across the Atlantic; entered Massachusetts Bay; discovered and named Cape Cod; stopped at an island now known as No Man's Land, and planted his colony on Cuttyhunk; but the colonists soon became discouraged and returned to England. Gosnold then organized a company, which settled at Jamestown, Va., in April, 1607. He died there Aug. 22, 1607.

GOSPELS. See *Britannica*, Vol. X, pp. 789-843. **GOSAMER**, a light filamentous substance, which often fills the atmosphere during fine weather in the latter part of autumn, or is spread over the whole face of the ground, loaded with dew-drops. This has been ascertained to be produced by small spiders, although it is not yet well known if the gossamer spread over the ground is produced by the same species of spider which produces that seen floating in the air, or falling as if from the clouds. The eagerness which some of the small spiders known to produce these webs show for water to drink, has led to the supposition that dew may be one of the objects of the formation of those on the ground, also that they may afford a rapid mode of transit from place to place. As to the gossamers in the air, conjecture is more at a loss; although the supposition that the spider forms them in order to shift from place to place is more probable. The spiders which produce these threads eject with great force from their spinnerets a viscid fluid which presently becomes a thread; sometimes several such threads are produced at once in a radiating form, and these, being caught by the ascending current of heated air, are borne upwards, the spider along with them. It has been said that the spider has power of guiding in the air the web by which it is wafted up.

GOSSE, EDMUND WILLIAM, an English poet and critic, born in London, Sept. 21, 1849, and educated privately. He was appointed assistant librarian at the British Museum in 1867; translator to the

board of trade in 1875; 1884-89 Clark lecturer in English literature at Trinity College, Cambridge. In 1884-5 Mr. Gosse visited America and delivered lectures before the Lowell Institute and before Harvard, Yale, and Johns Hopkins Universities. Mr. Gosse has published several volumes of poetry; critical essays in Scandinavian, Dutch, German, and English literature; and several works in English biography and criticism.

GOSSE, PHILIP HENRY, a British zoölogist, born at Worcester, April 10, 1810, died Aug. 23, 1888. He was reared at Poole; in 1827 went to Newfoundland as a clerk, and was afterwards in turn farmer in Canada, schoolmaster in Alabama, and professional naturalist in Jamaica. Returning to England he published in 1840 the "Canadian Naturalist," and after another stay in the West Indies settled in England to a busy life of letters. He was elected a fellow of the Royal Society in 1856.

GOT, FRANÇOIS JULES EDMOND, an eminent French comedian, born at Lignerolles (Orne), October 1, 1822. After a year's compulsory service in the army, he made his first bow to a Parisian audience in 1844 at the *Comédie Française*, of which society he became a member in 1850. M. Got is most deservedly regarded as one of the greatest actors on the French stage. He excels in the representation of the leading comic parts in the old classical dramas, and has created scores of original characters in modern pieces. On Aug. 4, 1881, the Cross of the Legion of Honor was conferred on M. Got at the Conservatoire.

GOTHA ALMANAC (*Almanach de Gotha*), a universal political register, published annually at Gotha, in Germany. It was issued in the German language from 1764 to 1804, and from the latter date till the present has been published both in French and German.

GOTHAM, a parish of Notts, England, whose people were long famed for their stupidity, being termed in derision "the wise men of Gotham." The name was by Irving humorously applied to the city of New York, and the appellation is still a familiar one in the United States.

GOTTSCALK, LOUIS MOREAU, an American pianist and composer, born in New Orleans, La., May 8, 1829, died at Tijuca, Brazil, Dec. 18, 1869. He early showed marked musical ability, and at the age of twelve was sent to Paris, where he studied the piano with Hallé and Camille Stamat, and harmony with Maleden. His first appearance was made in Paris in 1845. He afterwards traveled in Switzerland and Spain, and achieved a high reputation before returning to the United States. His first appearance in this country was made in Boston. He was subsequently heard in other cities of the Union, in Mexico, and South America. Gottschalk was popular as a man and admired as an artist. Among other decorations he received the cross of the Legion of Honor and the Order of Isabella the Catholic. His numerous pieces are chiefly illustrative of Southern life.

GOUGH, JOHN BARTHOLOMEW, a temperance lecturer, born at Sandgate, Kent, England, Aug. 22, 1817, died at Philadelphia, Pa., Feb. 18, 1886. At the death of his father, in 1829, he came to the United States, and was for a time employed on a farm in Oneida county, New York; in 1831 he went to New York city, where he became a bookbinder. After some years of poverty, caused by dissipated habits, which finally reduced him to the utmost misery, he reformed and devoted himself to the temperance cause, laboring with great zeal and success. He visited England in 1853, by invitation of the London Temperance League, and lectured for two years in the United Kingdom. He was

again in England in 1857-60 and in 1878. In some of his later addresses he took up literary and social topics, and acquired a moderate fortune by his lectures. He published an *Autobiography* (1846); *Orations* (1854); *Temperance Address* (1870); *Temperance Lectures* (1879); and *Sunlight and Shadow, or Gleanings from My Life-work* (1880).

GOULBURN, EDWARD MEYBRICK, an English clergyman and author, born in 1818. In 1841 he was elected a fellow of Merton, and after holding the Oxford incumbency of Holywell he became head master of Rugby, 1850-58. In 1858 he was prebendary of St. Paul's; was chaplain to the queen, and vicar of St. John's, Paddington, 1859, and dean of Norwich, 1866-89. Among his publications are: *The Philosophy of Grammar, With Especial Reference to the Doctrine of the Cases* (1852); *Thoughts on Personal Religion* (1862); and *The Office of the Holy Communion* (1863).

GOULD, BENJAMIN APTHORP, born at Lancaster, Mass., June 15, 1787, died in Boston, Oct. 24, 1859. He graduated at Harvard in 1814, and was appointed principal of the Boston Latin School, continuing in charge until 1828. Under his administration the institution became famous for thoroughness in classical teaching. Mr. Gould was one of the first Americans to annotate classical authors, and his critical editions of Horace, Ovid and Virgil, prepared for use in the Boston school, had an extensive circulation throughout the country. In 1823 failing health compelled him to relinquish teaching, and after several years spent in European travel he returned and engaged in the importing business. He subsequently filled important offices in his native State.

GOULD, BENJAMIN APTHORP, astronomer, born in Boston, Mass., Sept. 27, 1824, graduated at Harvard in 1844, and received the degree of Ph. D. at Göttingen in 1848. Returning to America, he conducted the "Astronomical Journal" from 1849 to 1861; was director of the Dudley Observatory at Albany in 1856-59, and in 1868 was appointed to organize and direct the National Observatory at Cordoba, in the Argentine Republic. He organized an admirable series of stations throughout the country, and mapped a large part of the southern heavens. In 1885 he returned to the United States, where he received the degree of LL.D. from Harvard in 1885, and from Columbia in 1887. Dr. Gould has published valuable astronomical reports and charts, and is a member of numerous scientific societies in Europe.

GOULD, HANNAH FLAGG, an American poet, born in Lancaster, Mass., Sept. 3, 1789, died in Newburyport, Mass., Sept. 5, 1865. She began her literary career by writing for periodicals. Her poems, published in 1832-36 and 1841, were much admired both in England and America. Her life was passed quietly in the homestead at Newburyport.

GOULD, JAY, an American financier, born at Roxbury, N. Y., May 27, 1836. He early developed a taste for mathematics and surveying, and on leaving school was employed in making surveys for county maps. He was afterwards employed for a short time in lumbering, and accumulated sufficient capital to become in 1857 the principal shareholder in the bank of Stroudsburg, Pa. He now began to buy up railroad bonds, and in 1859 established himself as a broker in New York city. He was president of the Erie Railway company till 1872; afterwards invested largely in the stocks of other railways and telegraph companies, and in 1881 became interested in the elevated railroad system of New York city. In 1882, a question of his financial stability having arisen, Mr. Gould produced for

examination stock certificates in his own name having a face value of \$53,000,000, and offered to produce \$20,000,000 more if desired. In 1887 it was estimated that he controlled over 13,000 miles of railway, or nearly a tenth of the entire mileage of the country. He died Dec. 2, 1892.

GOULD, JOHN (1804-81), an English ornithologist. From an early age he interested himself in the study of natural history, and in 1824 became employed in preparing specimens for the museum of the London Zoological Society. He gave much attention to humming birds, and collected more than 2,000 specimens, illustrating 820 species. Among his publications are: *A Century of Birds From the Himalaya Mountains* (1832); *The Birds of Europe* (1837); *Birds of Australia* (1848); *The Mammals of Australia* (1859); *Monograph of The Trochilidae* (1850); *Odontophorinae, or Partridges of America* (1850); *The Birds of Great Britain* (1873); and *The Birds of New Guinea* (1875).

GOULD, THOMAS R., sculptor, born in Boston, Mass., in 1818, died in Florence, Italy, Nov. 26, 1881. He early engaged in mercantile business, and did not devote himself to art until later life, his first work being done in 1851. He followed his profession in Boston until 1868, when he went to Italy and settled in Florence. In 1878 Mr. Gould visited Boston. Among his most celebrated statues are *The West Wind*, *Cleopatra*, *Timon of Athens*, and *Ariel*. He also executed several portrait statues, and a number of busts.

GOUNOD, CHARLES FRANÇOIS, a French composer, born at Paris in 1818. He received his musical education at the Paris Conservatory, where he enjoyed the instruction of the celebrated composers Halévy and Lesueur. In 1839 he gained the prize, and was thereby enabled to go to Rome for further study. At Rome he entered a priests' seminary for the purpose of devoting himself to old Italian church music. In 1843 he returned to Paris, and became there the musical director of a church, which position he held for six years. In 1851 he produced the *Messe Solennelle*. After that he gave his attention more to secular music, producing first the lyric drama *Sappho*, and several pastorals, which were not much appreciated. But his *Faust*, which appeared in 1859, captivated the French, and in some degree also the Germans. Afterwards Gounod composed other operas, less popular than *Faust*. Among them *La Reine de Saba*; *Mireille*; *Romeo and Juliet*—all from 1862 to 1867. The war of 1870 drove him to London, but he returned to Paris in 1875. In London he produced the opera *Polyeucte*, and a cantata, *Gabia*. After his return to Paris the opera *Le Tribut de Zamora* (1881), and the oratorios *Redemption* (1882), and *Mors et Vita* (1885), have been his chief productions. He has lately been elected a member of the French Institute.

GOULD. See Britannica, Vol. XI, pp. 4-5.

GOURKO, JOSEPH VLADIMIROVITCH, COUNT, a Russian general, born in 1825. He served as captain in the infantry during the Crimean war. In 1861 he became colonel, in 1873 brigade commander, and in 1876 division commander. At the outbreak of the war with Turkey in 1877, he commanded the Russian vanguard. At the Shipka Pass he joined the Russian main army after the Turks had compelled him to retreat. At the head of a corps of cavalry he invested Plevna, where Osman Pasha maintained a gallant struggle. Gourko compelled him to surrender, Dec. 10, 1877. After this Gourko crossed the Balkans in midwinter with 75,000 men, captured Sophia, Philippopolis, etc. At the end of the Turkish war he was made general of cavalry, and in 1883 military governor of Warsaw

GOUVERNEUR, a town of St. Lawrence county, N. Y., situated on the Oswegatchie River, and on the Rome, Watertown and Ogdensburg Railroad, 36 miles northeast of Watertown. It contains a seminary and several large mills. Pop., 3,458.

GOVAN, a police burgh of Lanark and Renfrew shires, on the south bank of the Clyde, outside the municipal boundaries of Glasgow, but connected with the city by continuous rows of buildings. Its leading industry is shipbuilding.

GOVERNMENT (see *Britannica*, Vol. XI, p. 9-21), the ruling power in a political community. It governs the community by means of laws, decrees, ordinances, rules, orders, etc. Every law, decree, etc., is a command issued by the ruling power to those who are bound to obey, and every such command restricts somebody's liberties. In some of the Swiss cantons all the citizens of the state assemble on stated days, and enact then and there the laws for the community. The "Landammann" executes the laws. These are pure democracies, and represent the ideal government. In all other republics of the present day the people elect representatives to make the laws for them. A "president" or "governor" executes the laws. These are representative republics. In most European monarchies the people elect delegates to make the laws for them, and a "monarch" executes these laws. These are *constitutional monarchies*. In Russia, China, Persia, etc., the monarch makes the laws and enforces them also. These are absolute monarchies. In some of the ancient republics the nobility (aristocrats) ruled absolutely. These were oligarchies. As none of these exist now, we shall not further consider them in this article; and since pure democracies are only possible in very small communities, we shall also dismiss this form from further consideration. We have then only three forms of governments to consider: (1) The representative republic; (2) the constitutional monarchy, and (3) the absolute monarchy.

The principal republican governments are the United States, France, Switzerland, Mexico, the Central American Republics, Hayti, Colombia, Bolivia, Peru, Chili, Venezuela, Brazil, and the Argentine Republic.

The principal constitutional monarchies are the British Empire, the German Empire, the Austro-Hungarian Empire, the Kingdoms of Denmark, Sweden and Norway; Holland, Belgium, Spain, Portugal, Italy, Greece, Servia, Roumania, and in Germany the Kingdoms of Prussia, Bavaria, Württemberg and Saxony, besides several duchies and grand duchies; in Asia, the governments of Japan, Afghanistan and Beloochistan.

The principal absolute monarchies are: Russia, Turkey, Egypt, Persia, China, Abyssinia, and Morocco.

A *federal government* rules over several states united for national purposes as for common offense and defense, for establishing mutual free trade, for common representation before other governments, etc. Such governments are those of the United States of North America, of Mexico, of Colombia, of Brazil, the Swiss government, the German Empire, etc. This form secures to each portion a local government for its domestic purposes, familiar with its habits and sympathizing with its peculiar wants. At the same time, it secures to the united nation a common government sufficiently powerful for its protection against foreign nations, and clothed with authority to provide general regulations for the welfare of the whole. But the powers of the federal and state governments must be clearly defined and distinctly limited; and the citizens of such states must be polit-

ically well educated, and in order to exercise their political rights intelligently, each state of such a union must be independent in those matters which concern itself only. On the other hand, all the members of the union must be subject to the federal power in those matters which concern all the states collectively. In such matters as these, the sovereignty of each state must cease. Among the subjects included in this latter category are the making of peace and war; the sending of ambassadors and ministers to other governments and the reception of their diplomatic agents; the levying of imports, internal revenues, etc., and the maintenance of a standing army and navy, and also of a postal service. In relation to other nations a federal union forms one state only. All those rights that are not distinctly delegated to the federal power belong to the several states individually.

Every good government is divided into three departments or branches—the legislative, executive, and judicial. The constitution of the United States carries out this principle with the clearest distinctness. In the first sections of its articles I, II, and III, it is respectively declared, that "all legislative power shall be vested in a Congress of the United States," etc.; "the executive power shall be vested in a President of the United States;" "the judicial power of the United States shall be vested in one supreme court, and in such inferior courts as the Congress may from time to time ordain and establish." Each of these departments aids the other two and acts as a check upon them. Together they work out most beneficial results.

The Congress of the United States consists of a Senate and a House of Representatives. The former represents the States, for the senators are appointed by the State governments. The latter represents the people directly, because the representatives are elected by the voters of their districts. The President can veto any bill passed by the Congress. But if it afterward receives the vote of two-thirds of each house, it becomes a law in spite of the President's veto. And if any law is subsequently brought into the Supreme Court to investigate its constitutionality, the Supreme Court has the power to decide whether it is constitutional or not. All these arrangements are well calculated to prevent hasty and inconsiderate legislation.

Similar arrangements exist in the several States. After a State legislature has passed a bill, the governor of the State can veto it, but the legislature may subsequently pass it over his veto by a two-thirds vote. And if, after a bill has become a law, it is carried into the Supreme Court of the State, this court has the power to declare the law unconstitutional. These restraints upon legislation are necessary, because, under popular governments like ours, where the people are in close contact with the legislators, all the petty grievances, wants and wishes are taken to the latter for redress, and there is always danger of too much legislation, of overdoing the thing by passing numerous private or special laws to the detriment of the majority of the citizens.

Our government is often called a "government of the people, for the people and by the people." This is a figurative expression. For the "people" of the United States do not govern directly. They only elect their ruling officials very frequently; and by this means, and the public press, they exert a powerful influence over them. Nevertheless the laws and constitutions are enacted in the name of the "people." As an example, we insert here the opening words of the Constitution of the United States, which read as

follows: "We, the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare and secure the blessings of liberty to ourselves and our posterity, do *Ordain and Establish this Constitution for the United States of America.*" This sentence gives us a clear and forcible answer to the question, "Why do people voluntarily surrender their natural liberty and equality, constitute governments and obey their commands, laws and decrees?" "The social compact" is to secure safety, tranquility, justice and the general welfare.

GOVERNMENT'S ISLAND, in Rock Island county, Ill., lies in the Mississippi River, between the cities of Rock Island, Ill., and Davenport, Iowa. It belongs to the United States Government, has fine armories and arsenals, and is connected by bridges with either shore. During the civil war it was used as a military prison. Area, 960 acres.

GOWAN, OGLE ROBERT, born in County Wexford, Ireland, in 1796, died in Toronto, Can., Aug. 21, 1876. He received a good education, and early became editor of the "Antidote," a newspaper of Dublin. Removing to Canada in 1829, he resided for a time in Escott, and afterwards in Toronto. He served with distinction against the insurrectionists of 1837-39; was a member of the Canadian Parliament (1834-41), and was for a time postoffice inspector and subsequently a license-officer in Toronto. He was the founder of the Orange lodges of North America, and was for 20 years their grand master.

GOWANDA, a village of New York on Cattaraugus Creek, the boundary line dividing Cattaraugus and Erie counties. It has manufactories of flour, agricultural implements, carriages, and cheese-boxes. Population (1890), 2,000.

GOWER, Mrs., *née* Mdle. Nordica, the *prima donna*, is an American by birth, and received her early musical education at the Boston Conservatory of Music. She afterwards proceeded to Italy to complete her training. Her chief triumph on the operatic stage has been her impersonation of the part of Marguerite in Gounod's "Faust." Mdle. Nordica married some years ago Mr. Gower, who is now deceased.

GRACE, an expression frequently used in Scripture and in theological discussion. Its distinctive meaning is the idea of *free and unmerited favor*. According to Aristotle this is the proper meaning of *charis* (*Gr.*, *grace*), even when applied to man. It is a benefit springing out of the liberality and free-heartedness of the giver, and bestowed without any hope or expectation of reward. Applied to God in the New Testament and in theology, it denotes the free outcoming of his love to man; and when man, on the other hand, is said to be in a state of grace, it implies that he is in the enjoyment of the divine love and favor. St. Paul draws a sharp contrast (Rom. xi, 6) between *charis* and *erga* (*Gr.*, *works*), as mutually excluding one another. "And if by grace, then it is no more of works: otherwise grace is no more grace. But if it be of works, then it is no more grace; otherwise work is no more work." Theologians have distinguished grace into *common or general*, and *special or particular*. *Common grace* is supposed to denote the love which God has to all his creatures, and the light of nature and conscience which they all enjoy. *Special grace* is the love which God has for his elect people, and by which he saves them from their sins.

GRACKLE, the common name of many birds of the Starling family (*Sturnidæ*). See *Britannica*, Vol. XI, p. 26.

GRADY, HENRY WOODFIN, born at Athens, Ga., in 1851; died at Atlanta, Ga., December 23, 1889. He was educated at the State University at Athens, and took a post-graduate course at the University of Virginia. He became editor of the *Rome* (Ga.) *Daily Commercial* and afterward of the *Atlanta Herald*. For some time he acted as Southern correspondent of the *New York Herald*, and, in 1880, he became part owner and managing editor of the *Atlanta Constitution*, which he conducted until his death. In December, 1886, he accepted an invitation to address the New England Society at their annual dinner. His address was received with the greatest enthusiasm and the whole country was stirred by his eloquent and impassioned plea for the New South. He became the idol of his native State. Just prior to his death, he delivered an address on "The Future of the Negro," before the Merchants' Association in Boston. He succumbed to an attack of pneumonia contracted in New York and died on his way home. A handsome monument was erected in Atlanta, Ga., to his memory.

GRÄFENBERG, a village in the northwest corner of Austrian Silesia. It is celebrated as the spot where the water-cure was introduced in 1826 by Vincenz Priessnitz (1799-1851).

GRAFFITI (Ital., *graffito*, a scratching), or WALL SCRIBBLINGS, the name given to certain classes of mural inscriptions and drawings found at Pompeii, Rome, and other ancient cities in Italy. They are generally scratched with a sharp instrument, or scrawled with red chalk or charcoal, on walls, door-posts, and portico-pillars, and seem to be the work of idle triflers; but some were executed with more serious intention. The subjects that oftenest occur are doggerel verses, quotations from the poets, amatory effusions, rude caricatures, especially of gladiators, etc. The more serious examples are electioneering admonitions, play-bills, and similar public announcements, philosophic apothegms, notices of household events, etc. These scribbles serve as an admirable index to the current life of the people, especially in Pompeii. Without them we should have a far less adequate idea of the street life of the ancient Roman people, and of the phraseology and idiom of the vernacular spoken toward the end of the first century A. D. in Southern Italy. Three alphabets were used—Latin, Greek, and Oscan. In Rome *graffiti* have been found on some of the great buildings, as the palace of the Cæsars and Nero's golden house.

GRAFTING: in horticulture, the uniting of a shoot or scion, containing one or more buds, to a stock or root, with a view, by their union, to produce a superior fruit. There are a number of ways of grafting: for an account of some of which the reader is referred to the article on *HORTICULTURE*, in *Britannica*, Vol. XII, pp. 236-37. On farms cleft-grafting is the form generally adopted, and the only tools required are a sharp saw, a keen pocket-knife, a butcher-knife and a mallet, for splitting the stocks, and grafting wax for spreading over the mutilated parts. The stock is sawed off square, split, and two scions inserted, one on each side, tapered down to a wedge shape, and so placed that the inner bark of the stock and the scion will just meet. Old orchards may be renewed and the fruit improved by grafting the limbs with desirable varieties, the thorough pruning involved infusing new life; and new varieties can sooner be brought into bearing when thus top-grafted than if planted as nursery trees. Fine results have been attained by grafting a third of the limbs of a tree at once, and the remaining two-thirds at intervals of a year. Twenty-eight and one-half bushels of choice apples are reported to have been gathered, in Con-

necticut, in the sixth year from the first grafting, from a single tree that was seventy-five years old, and had previously borne inferior fruit.

Another common mode of grafting is by inarching. A modification of this may be practiced where the bark of a valuable tree has been injured. The injury is pared smooth at the edges of the bark down to the live wood, and a piece of healthy bark fitted accurately thereto, and covered with grafting wax until it is healed, or scions set close together, and brought fresh bark to fresh bark, at top and bottom, and securely fastened.

In root-grafting experience proves that a perfect union of the root and scion may be effected at any point of the root, and that cuts of roots of one or two years' growth, smooth and straight are best. These should be taken up from the seed-bed in the fall, selected, tied in bundles, and stored in a cellar or buried in the soil, where they will remain fresh. After the roots have been cut into pieces 2 to 4 inches in length, and the scions prepared, the work of grafting may be taken up at any time during the winter. In performing the work the grafter takes up a stock, cuts the slope near the collar, and also the tongue, if that style of grafting is to be done. The tongue and slope of the scion have been previously cut and the scions laid ready to hand. The grafter then picks up a scion and adapts it to the root-stock, the tongues of the two keeping them together. The process of grafting is completed by applying melted wax with a brush, and wrapping the grafts with waxed strips of muslin or paper, or tying them with waxed thread. By a division of labor immense numbers of grafts may be turned out. Machinery has also been applied to the business, and grafting apparatus facilitates the work. One machine consists of a frame or gauge which regulates the angle of the slope, which is cut with a broad chisel, while others consist of shears to cut the slope and tongue at one operation.

The grafting of grapevines has never been successful until quite recently. For this operation the earth is removed from the old vine as far as the root will permit, exposing the collar. The vine is cut off 3 or 4 inches below the surface of the earth. Cuts are then made in the stub about half an inch deep or a little more. These clefts are made with the "Wagner saw," which has two thin saw-blades $\frac{1}{2}$ inch apart, with a sharp chisel blade between them, and the scions of the grape to be propagated about 6 inches long, are inserted into these clefts in the stump, letting their lower ends extend into the soil below the incision. In order to effect this the cuts are made obliquely downward into the bark and wood of the root. The earth is firmly pressed about the cutting and the stock, and only one or two eyes of the scions left exposed. This method of grafting the grape-vine permits the use of strong-growing varieties as stocks for those that grow less vigorously. If, for instance, the Delaware vine, which is a slow grower, is grafted upon a Concord stock, which is a strong grower, a more vigorous Delaware vine is secured, inclined to produce larger berries and more of them, and less inclined to drop the leaves. Where phylloxera has devastated vineyards, it has been found necessary to graft the desired varieties upon the roots of varieties that are not affected by the destructive insect.

GRAFTING: in surgery, is the transplanting of a portion of flesh, bone or skin to supply a deficiency caused by disease or wounds. The material may be taken from another part of the same body, as in the case of skin-grafting is usual, or from another person or animal, which is the usual method in bone or flesh-grafting. This system has grown

in favor as the structure of the body has become better understood—the construction of the tissues, and the methods by which the process of repair can be assisted. Under the titles of ANATOMY, PATHOLOGY, and SURGERY, in *Britannica*, Vols. I, XVIII, XXII, the subjects are well considered.

At first applied in repairing injuries to the nose, ears, and lips to render deformity less conspicuous by Tagliacossi (see *Britannica*, Vol. XXIII, p. 20), skin-grafting is now used also in cases where large surfaces of the skin are abraded, or where burns or scalds have taken off the cuticle. This is called Reverdin's operation. Small pieces of skin are planted over the exposed surface, which become fixed and extend toward each other and toward the extensions put out by the sides of the wound. Although the result is not true skin, it is a healthy tissue, and prevents, where it is successful, the sloughing of a wound and dangerous complications. A case reported as having recently occurred in New York has caused much comment. A prominent member of a club was unfortunate enough to lose a large patch of the skin of his face, whereupon a number of his club associates volunteered to have small patches of their respective skin, generally from the left arm, removed for his benefit. All these small patches were transplanted to the bared surface of the patient, and made up a complete covering of the denuded part. The operation was reported to have been successful.

BONE-GRAFTING has also been tried with varying success. In a case lately reported in New York, where the shinbone of a boy had been injured, the defective part of the bone was carefully removed, but leaving a portion of the osseine intact, and a similar portion of a bone of a dog's fore-leg was fitted into the vacated space without detaching it from the live dog. The boy and dog were kept immovably connected for some time, in order to induce the two joined bones to grow together. But the operation appears to have been only a partial success.

Prof. A. F. McGill, of Leeds, England, reported in 1889 the successful treatment of a case of "non-united bone fracture," by the use of a bone-graft taken from a rabbit. The patient, a young man of twenty, had been suffering for a year from a fractured forearm. The fracture was compound, the wound being on the radial side. Through the wound the broken ends protruded. The ulna united perfectly, but the fragments of the radius would not join. Three months after the accident a surgeon exposed the ends of the bone, refreshed them, and wired them together. The wound healed, but the fragments did not unite.

Several months later the patient applied to Dr. McGill for relief. The bones were bared for the space of three inches, and the ends found rounded, with no signs of union, but covered with a thick membrane resembling periosteum. This was filed away and the bone tissue again bared, and an interval of three-fourths inch left between the punctured ends. Then small fragments of the femur of a freshly-killed rabbit (six months old) were taken, having been chiseled out of the femur—13 pieces of one or two lines in length; and with these the interval between the ends of the bones was filled, and the inserted pieces were held together by the replaced skin, which was carefully stitched, and the whole held in place by numerous catgut sutures. No drainage tube was used. In about a month the patient left the hospital fully cured, and with the arm as useful as ever.

GRAFTON, the county-seat of Walsh county in the northeastern part of N. Dak., about 110 miles north of Fargo. Pop. (1890), 1,594.

GRAFTON, the county-seat of Taylor county, W. Va., on Valley River. The chief industries are lumber and coal. The village has railroad shops, foundries, and flouring mills. Pop., 3,159.

GRAHAM, SIR GERALD, LIEUTENANT-GENERAL, a distinguished British soldier, who received in 1855 the coveted order of the Victoria Cross for personal bravery at the assault of the Redan, was born in Cumberland in 1831. He entered the Military Academy at Woolwich in 1847 and received his commission as second-lieutenant in the Royal Engineers in 1850. He served through the Crimean campaign and fought at Alma and Inkerman and was twice wounded. He received numerous medals, and for conspicuous gallantry was made a Knight of the Legion of Honor. He took part in the China war of 1860 and was severely wounded at the assault of the Taku forts. He was present at the capture of Peking. In 1882 he commanded the 2nd brigade of the 1st division in the Egyptian campaign, receiving the thanks of both Houses of Parliament. He defeated a large force of Arabs at Tamai, with great slaughter. In 1885, after the fall of Khartoum, he commanded an expedition to Berber and laid the Suakin and Berber Railroad. On the 20th of March, 1885, he fought the battle of Hasheen. He was decorated with the Grand Cross of SS. Michael and George by Queen Victoria. He has contributed some valuable articles upon military matters to current literature and translated Von Goetze's *Account of the German Engineers' Operations During the Campaign 1870-71*. His *Last Words with General Gordon*, contributed to the *Fortnightly*, was a paper of much public interest.

GRAHAM, SYLVESTER, vegetarian, born in Suffield, Conn., in 1794, died in Northampton, Mass., Sept. 11, 1851. In 1823 he entered Amherst College, intending to prepare for the ministry, but did not complete the course. He began to preach in 1826, and in 1830 engaged in the temperance work. Becoming convinced that intemperance could be cured by the adoption of a purely vegetable diet, he afterwards applied the theory to other forms of disease. He published *Essay on Cholera* in 1832, and in 1839 delivered a course of lectures entitled *Graham Lectures on the Science of Human Life*. He also published *Bread and Bread-making; A Lecture to Young Men*, and one volume of *The Philosophy of Sacred History*.

GRAHAM, WILLIAM ALEXANDER, an American statesman, born in Lincoln county, N. C., in 1804, died at Saratoga, N. Y., Aug. 11, 1875. He became a lawyer, and in 1833 was elected to the Legislature of North Carolina. Several times he was chosen speaker of the Assembly of that State, and in 1841 he was elected United States Senator. From 1845 to 1849 he was governor of North Carolina. When Fillmore became President, he appointed Graham Secretary of the Navy. In June, 1852, the Whig party nominated him for Vice-President, but he was defeated. After this he remained in private life until 1864, when he became a Senator in the Confederate Congress.

GRAHAME, JAMES, historian, born in Glasgow, Scotland, Dec. 21, 1790, died in London, England, July 3, 1842. He graduated at St. John's College, Cambridge, and in 1812 was admitted to the Scottish bar. He subsequently removed to the south of England. In 1827 he published the first two volumes of a history of the United States, and in 1836 a new edition in four volumes was published, bringing the history down to the year 1776. The work was highly praised by the historian Prescott and others, but was not popular in England, because of its thoroughly American spirit. A Philadelphia edition was published in 1845.

GRAND BANK, a fishing village and port of entry on the south side of Fortune Bay, N. F. It has considerable trade.

GRAND BANK, a submarine plateau in the Northern Atlantic, extending about 350 miles eastward from Newfoundland. Its formation is attributed to the deposit of stone and earth from icebergs melted by the warm waters of the Gulf Stream. The Grand Bank is the headquarters of the cod-fishery.

GRAND BAY, or **HA-HA BAY**, an inlet from the Saguenay River in Chicoutimi county, Quebec, Can. It is a beautiful sheet of water, averaging a mile in width and about 100 fathoms in depth, and is a source of attraction to summer tourists.

GRANDEES (Span., *Grandes*), since the 13th century the most highly privileged class of nobility in Castile, the members of the royal family being included. Their honors were hereditary; they held lands from the crown on the tenure of military service, were exempted from taxation, could not be summoned before any civil or criminal judge without a special warrant from the king, and could leave the kingdom, and even enter the service of a foreign prince at war with Castile, without incurring the penalties of treason. They had also the right of being covered in the presence of the king. In the national assemblies they sat immediately behind the prelates and before the titled nobility (*titulados*). Under Joseph Bonaparte their privileges were entirely abolished, but they were partially regranted at the subsequent restoration. Grandees are still members of the Senate in their own right.

GRAND FORKS, the county-seat of Grand Forks county, N. Dak., on the Red River of the North. It contains the University of North Dakota. P., 7,500.

GRAND HAVEN, capital of Ottawa county, Michigan, on Lake Michigan, and on the south bank of Grand River, 31 miles west by north of Grand Rapids by rail. It has a good harbor, with two lighthouses, and ships large quantities of lumber and grain. It contains several lumber mills and manufactories of wooden-ware, etc.; and a magnetic spring renders the place a summer resort. Pop., 5,914.

GRAND ISLAND, a city, railroad junction, and county-seat of Hall county, Neb. Shipping grain is the chief industry. Pop. (1890), 7,536.

GRAND JUNCTION, the capital of Mesa county, Colo., on the Denver and Rio Grande Railroad, at the confluence of Grand and Gunnison Rivers.

GRAND JUNCTION, a town of Greene county, Iowa, on the Chicago and Northwestern Railroad, where it crosses the Des Moines and Fort Dodge Railroad, 38 miles south of Fort Dodge. The principal business in the vicinity is farming and stock-raising. Pop. (1890), 932.

GRAND LEDGE, a village of Eaton county, Mich., 12 miles west of Lansing. It has a mineral spring, is a health resort, and has good water-power. Pop. (1890), 1,606.

GRAND MANAN, an island in the Bay of Fundy, 22 miles long and from 3 to 6 wide, belonging to New Brunswick. It is fertile and has many good harbors. The chief settlement is Grand Harbor. The cod, herring, and haddock fisheries are important. The island is a summer resort.

GRAND MONADNOCK, or **MONADNOCK**, a solitary mountain peak of Cheshire county, N. H., supposed to be a detached member of the White Mountain group. It is 3,718 feet high.

GRAND PRÉ (postoffice Lower Horton), a village lying in the basin of Minas, Kings county, N. S., 15 miles from Windsor. It is the scene of Longfellow's *Evangeline*. The village contains a seminary.

GRAND RAPIDS, a city and county-seat of Kent county, Mich., at the head of steamboat navigation on Grand River, and at the junction of six railroads. It is 60 miles west-northwest of Lansing. The sawing and planing of pine and hardwood lumber, and the manufacture of furniture, cooperage, and wooden-ware, are the leading industries. Farm implements, iron goods, wire, leather, flour, machinery, beer, chemicals, white bricks, cement, stucco-plaster, and land-plaster are also extensively manufactured. See *Britannica*, Vol. XI, p. 47. Population in 1860, 8,025; 1870, 16,507; 1880, 32,016; 1890, 64,147.

GRAND RAPIDS, a city and county-seat of Wood county, Wis., on Wisconsin River. Lumbering and agriculture are the chief occupations. There are lumber mills, machine shop, and foundry in the city, and pure kaolin is found in the vicinity. Pop. (1890), 1,702.

GRANGER, GIBSON, born in Suffield, Conn., July 19, 1767, died in Canandaigua, N. Y., Dec. 31, 1822. He graduated at Yale in 1787, was admitted to the bar, and soon became prominent in his profession. He was a member of the Legislature of Connecticut, and was instrumental in the establishment of the school fund; became Postmaster-General of the United States in 1801; and in 1819 was elected to the State Senate.

GRANGER, GORDON, born in New York in 1821, died in Santa Fé, New Mexico, Jan. 10, 1876. He graduated at the United States Military Academy in 1845, engaged in the Mexican war, and at the commencement of the civil war was assigned to duty on the staff of Gen. Sturgis. In September he was appointed colonel 2d Michigan cavalry, in 1862 commanded the cavalry on the operations that led to the fall of Corinth, and commanded various districts in Kentucky and Tennessee. He was in command of the 4th army corps at the battle of Missionary Ridge; of a division at Fort Gaines, Ala., in 1864; and commanded the 13th army corps in the southwest, engaging in the siege of Fort Morgan, and throughout the operations that resulted in the fall of Mobile. He was brevetted first-lieutenant and captain for services in the Mexican war, and for gallant conduct in the civil war, the brevets from major to that of major-general were conferred upon him. In January, 1866, he was mustered out of the volunteer service; in the following July was promoted to colonel, and at the time of his death was in command of the district of New Mexico.

GRANGERS, an American national association of agriculturists, founded by a government clerk named Kelly in 1867, under the title of "patrons of husbandry." The objects of this secret society, with its ritual and its four orders for men and women, are the social improvement and industrial benefit of the farming class: music and literary exercises at the meetings and the establishment of libraries have proved useful for the former, and organization and the spread of newspapers published in the interest of farmers have advanced the latter object. The discussion of political questions at the meetings is forbidden. In 1871 there were only some 200 granges organized; in 1875 there were 30,000; and, although dissensions for a time greatly reduced the strength of the order, in 1885 at the annual session of the national grange 34 state granges and 24,000 subordinate granges were represented.

GRANT: in English law, the conveyance of property by deed. Movables are granted when they are comprised in a bill of sale or deed of gift. The real property act of 1845 enacted that the immediate freehold might be conveyed by deed of grant. In the United States generally livery of seizin is

dispensed with, and the term "grant" applies to all transfers of real property.

GRANT, SIR ALEXANDER (1826-84), a Scotch educator. He was educated at Harrow and Balliol College, Oxford, and was elected to an Oriel fellowship. He succeeded as baronet in 1856, was appointed inspector of schools at Madras, India, in 1858, and became professor of history in Elphinstone College there; then its principal, and afterwards vice-chancellor of Elgin College, Bombay.

GRANT, ULYSSES S. General of the United States Army, and eighteenth President of the United States, was born at Mt. Pleasant, O., April 27, 1822, and died on Mt. McGregor, near Saratoga N. Y., July 23, 1885. He was the son of Jesse R. and Hannah S. Grant, of Scottish ancestry. General Grant was the oldest of six children. His father was a tanner, as well as farmer, but Ulysses spent his early youth in aiding in the farm work. In the spring of 1839 he was appointed to a cadetship in the United States military academy at West Point, N. Y. As a student he was specially characterized by proficiency in mathematics and in cavalry drill, but gained a fair standing in all his studies. In horsemanship he held the highest standing in his class. At his graduation in 1843 his general average was marked 21 in a class of 39. Receiving his commission as brevet Second Lieutenant he was attached to the 4th Infantry, and was assigned to duty at Jefferson Barracks near St. Louis. Early in 1844 he accompanied his regiment to Camp Salubrity, La. In September, 1845, he was commissioned Second Lieutenant, and was transferred with his regiment to Corpus Christi, Texas, to aid the army of occupation under General Zachary Taylor. He participated in the battles of Palo Alto, May 8, 1846, Resaca de la Palma, May 9, 1846, (and in the latter commanded his company,) and Monterey, Sept. 23, 1846. In the last battle, when the troops had gained an advanced position, a volunteer was called for to make his way to the rear under heavy fire and order up the ammunition wagons. Lieutenant Grant instantly volunteered and successfully accomplished the perilous work. He took part under General Scott in the siege and capture of Vera Cruz in March, 1847, and later in the battle of Cerro Gordo, San Antonio, Churubusco, Molino del Rey, and Mexico. In all of them his conduct was characterized by the highest and most intelligent bravery. On the withdrawal of the troops from Mexico he was granted leave of absence, and visited St. Louis where, on Aug. 22, 1848, he married Miss Julia B. Dent, sister of one of his classmates.

Soon after, he returned to his regiment, and in the spring of 1851 was transferred to Sackett's Harbor, N. Y., and later to Detroit, Mich.; and again to Sackett's Harbor; and from the latter place he sailed July 5, 1852, with his regiment, via Panama, for California, and thence to Fort Vancouver, Oregon. On Aug. 5, 1853, he was promoted to a Captaincy in the Regular Army. On July 31, 1854, he resigned his commission and settled on a small farm near St. Louis. He remained on the farm and in real estate, until April, 1860, when he removed to Galena, Ill., and there became a clerk in the hardware and leather store of his father.

The attack on Fort Sumter in Charleston and the opening of the great civil war, in 1861, restored to the army General Grant, who instantly and warmly espoused the Union cause, and presided at the first Union meeting held in Galena. On June 17, 1861, he was appointed Colonel of the 21st Regiment of Illinois Volunteers and was soon in the field and a little later in charge of a sub-military

district in Missouri under Gen. Pope, his command consisting of three regiments of infantry and a section of artillery. He was appointed a brigadier general Aug. 7, 1861, his commission dating from May 17. He was ordered to Ironton, Mo., where he reported a day later. Ten days after he was ordered to St. Louis, and thence to Jefferson City, and eight days later was directed to report in person at St. Louis, where he found that he had been assigned the command of the military district of Southeastern Missouri, embracing all the territory of Missouri south of St. Louis and all Southern Illinois, with permanent headquarters at Cairo. Instantly he was at the work assigned him. He arrived at Cairo Sept. 4, and the next day hearing that the Confederates were about to seize Paducah, Ky., he moved the same night and early next morning was in possession of the place, and issued his famous proclamation to the citizens, in which he said: "I have nothing to do with opinions, and shall deal only with armed rebellion and its aiders and abettors." Gen. Grant's first engagement was on the morning of Nov. 7, when having learned that the enemy had established a camp at Belmont, opposite Columbus, he resolved to attack it and with a force of about 2,500 moved down the river and landing about three miles above the place, moved rapidly forward and led the attack in person. In the spirited engagement his horse was shot under him, but the enemy was routed and his camp captured, after which Grant returned to his boats with 175 prisoners, and two guns, and having spiked four other guns of the enemy. The whole force of the enemy was about 7,000, of whom 642 were lost. General Grant's loss was 485 men. The capture of Fort Henry came next, followed by that of Fort Donelson. In the latter Grant captured 65 guns, 17,600 small arms and 14,623 prisoners, with an additional loss to the enemy of 2,500 killed. Grant's loss was 2,041 killed, wounded and missing.

The remaining story of General Grant's life is that of the great civil war itself—the record of great battles, great achievements, and great successes over a gallant and powerful foe. A few additional dates only are needed in this outline sketch of the great General. The grade of Lieutenant-General was revived by act of Congress in February, 1864, and General Grant was nominated by President Lincoln for the post on March 1, and the nomination was confirmed by the Senate on March 2. He left March 4, in obedience to the order of the President for Washington, where he arrived on the 8th, and on March 9, received his commission as commander of all the Union armies. On April 9, 1865, the surrender to General Grant of General Lee, the commander in chief of the Confederate armies, with his whole forces composing the army of Virginia, took place at Appomattox Court House, and the war virtually ended.

Gen. Grant returned to Washington, April 10, to supervise the work of disbanding the armies. President Lincoln was assassinated on the evening of April 14, and it is believed that Gen. Grant would have shared the same fate had he not been out of the city on that date. On the accession of Vice President Johnson to the presidency immediately following the death of Mr. Lincoln, he (Johnson) indicated a purpose to have Lee and others punished for the crime of treason, under an indictment found by the United States Court in Virginia. Gen. Lee appealed to Gen. Grant asking to be permitted to enjoy the privileges of amnesty extended by presidential proclamation to others of the Confederate army. Grant endorsed the application as follows: "Respectfully forwarded, through the Secretary of War, to the President,

with the earnest recommendation that the application of Gen. Robert E. Lee for amnesty and pardon be granted him." But President Johnson emphatically denied the petition. Lee then appealed to Gen. Grant for protection and the latter endorsed the letter by a strong statement in which he said: "In my opinion the officers and men paroled at Appomattox Court House, and since upon the same terms given to Lee, cannot be tried for treason so long as they preserve the terms of their parole . . . and I would ask that he (Judge Underwood) be ordered to quash all indictments found against paroled prisoners of war, and to desist from further prosecution of them." The result was the abandonment of the prosecution. But the estrangement between the President and Gen. Grant continued. On July 25, 1866, in accordance with an act of Congress previously passed creating the rank of *General*, a rank higher than any previously existing in the United States, Lieutenant General Grant received the commission of GENERAL.

In the latter part of 1866 President Johnson, finding that General Grant would not support some of his measures, ordered him out of the country on a special mission to Mexico; but General Grant declined the mission on the ground that it was outside of the military service. Various other efforts were made to remove General Grant, but he was promptly sustained by Congress and by the great body of the people, and in 1868 he was nominated and elected President of the United States, carrying the electoral votes of 26 out of 34 states, and 214 electoral votes out of a total of 294. Four years later he was re-elected, carrying 31 states with a popular vote of 3,597,070, and an electoral vote of 286 out of a total of 352. During his two presidential administrations the taxes were reduced over \$300,000,000 and the public or national debt over \$450,000,000.

After retiring from the Presidency March 4, 1877, Gen. Grant decided to visit foreign countries and on May 17 of that year he sailed from Philadelphia for England accompanied by his wife and son. He was everywhere received with "royal greetings" by the sovereigns and peoples of the old world.

After leaving Great Britain he visited the continental countries of Europe and then journeyed through Egypt and Palestine; thence he sailed for India, visiting Calcutta and other places of interest. In the latter part of March, 1879, he sailed for Burmah and later visited the Malacca peninsula, Siam, Cochin China, and Hong Kong, reaching the last named place April 30th. Next he made a tour into the interior of China. At Peking Prince Kung requested him to act as arbitrator in settling a controversy between China and the Loo Choo Islands. In this matter, while prevented by his plans from acting in a formal arbitration, he studied the question in controversy, and gave such advice as to aid in a settlement without war. Next he visited Japan where the honors showed him were even greater than those received in any other country. He sailed from Yokohama Sept. 3, 1879, reaching San Francisco on Sept. 20 and received the heartiest of greetings everywhere on the Pacific coast, and on his journey eastward through the states to his former home in Galena. Early in 1880 he visited some of the southern states and Mexico.

The enthusiasm of General Grant's receptions in the old and new worlds, the favorable impression made upon the public by his brief, prudent, and practical speeches while abroad, together with the high estimate of his military genius and his civil administration as President of the United States, led many of his friends to seek for him the

nomination for a third presidential term. At the Republican nominating convention held in Chicago in June, 1880, the name of General Grant was presented and during the first thirty-six ballots secured votes ranging from 302 to 313. Owing, however, to the objection of many of the delegates to the nomination of General Grant for a third term, his adherents, to the number of 306, found themselves without the necessary support in the convention, and that body finally declared itself, upon a closing ballot, in favor of General Garfield.

In 1881 General Grant purchased a house in New York which he subsequently made his home, spending a part of his summers in a cottage presented to him at Long Branch near the city. The great interest taken by the public in a series of articles furnished by General Grant to *The Century* induced his friends to urge him to write his own biography to the close of the Civil War. He consented to do this, especially as the contract he was able to make with the publishers of his books promised him such large financial returns, as would relieve his family from much of the embarrassment caused by the losses of his property through the fraudulent conduct of some of his former partners in business. His contract for his biography, two volumes octavo, was signed Feb. 27, 1885, the work appearing about a year later; and so large was the patronage of an appreciating public, that the share of the profits insuring to Mrs. Grant and family from the first two years' sales, reached the large sum of nearly \$400,000!

In the summer of 1884 General Grant began to suffer from what soon proved to be a cancer at the root of the tongue. The sympathy of the whole nation was aroused in his behalf, and on March 4, 1885, Congress passed a bill making him General on the retired list, thus restoring him to the rank from which he resigned after the close of the war. In the meantime General Grant knowing that his disease was rapidly shortening his life, diligently worked on his biography, in the midst of almost continuous and intense suffering, heroically persisting in the task even after he became speechless, and until its completion, only four days before his death!

A few weeks before his death General Grant accepted the occupancy of an amply furnished cottage on Mount McGregor generously tendered to him by Mr. Joseph W. Drexel, of Philadelphia. There, in the quiet of that unpretentious, rural summer home, surrounded by his family, and enjoying the sympathy of the whole nation, and the respect and admiration of the nations of the world, he passed away, July 23, 1885. Since the burial of the Duke of Wellington, no great military hero had been interred with the honors which awaited the arrival of the illustrious soldier's remains in New York City. Magnificent as a mere pageant, it was equally so as the spontaneous outpouring of a great nation's grief and admiration.

Mrs. Julia Dent Grant, widow of the late Gen. U. S. Grant, was born in St. Louis, Mo., Jan. 26, 1826. She first met Lieut. Grant, then of the 4th Cavalry, at St. Louis in 1844, and was married to him on Aug. 22, 1848. She was often with him during his military career, and accompanied him on his victorious return to Washington at the close of the war. She presided over his home during his presidential official terms accompanied him in his journey around the world, and was

ever the faithful and beloved "queen" of his home circle. After his death she was granted a yearly pension of \$5,000. A similar pension has been granted to three other widows of Presidents—Mrs. Polk, Mrs. Tyler, and Mrs. Garfield. At this writing Mrs. Grant still resides in New York City, surrounded by her children (Frederick Dent, Ulysses S., and Jesse) and her grandchildren.

Frederick Dent Grant, oldest son of the late Gen. Grant, was born in St. Louis, May 30, 1850. He accompanied his father during the civil war, and was in five battles before he was thirteen years old. He graduated at West Point at the age of 21, and was assigned to the 4th Cavalry. In 1871 he accompanied Gen. Sherman to Europe. A year later he was detailed to command the military escort to the parties making the survey for the Southern Pacific Railway. In 1875 he was assigned, with the rank of lieutenant-colonel, to the staff of Gen. Sherman, holding the position for eight years, when he resigned. He was with his father during his trip round the world, and was his father's constant assistant during his closing years.

GRANVILLE, GRANVILLE GEORGE LEVESON-GOWER, EARL, an English statesman, born in London in 1815, died March 30, 1891. After being educated at Eton and Christ Church, Oxford, he entered public life in 1835 as an attaché to the embassy at Paris, where his father was the ambassador. In 1836 he was elected to Parliament. In 1846 he succeeded to the title. Granville was under-secretary for foreign affairs, 1840-41; vice-president of the board of trade, 1843-51; foreign secretary, 1851-52; lord-president of the council, 1852-54; again 1855-58; and 1859-66. He was colonial secretary, 1868-70, and secretary of state for foreign affairs, 1870-74, and again from 1880 to 1885. When Gladstone became prime minister, in 1868, Granville was made secretary for the colonies. He held several other offices and positions of honor—as, for instance, when he represented Great Britain at the coronation of Czar Alexander, at Moscow in 1856. As to his politics, Granville was one of the most outspoken Liberals in the House of Lords.

GRANVILLE, a village of Washington county, N. Y. Its industries are agriculture, quarrying, and the manufacture of roofing slate and mantels and other articles made of marbled slate.

GRANVILLE, a village of Licking county, Ohio. It is the seat of Denison College, two female colleges, and has several manufacturing establishments. Pop. (1890), 1,306.

GRAPE, the berry of climbing shrubs called vines, indigenous to warm latitudes, and much cultivated in all ages and in both hemispheres. See HORTICULTURE, *Britannica*, Vol. XII, pp. 277-28; VINE, Vol. XXIV, pp. 237-38; WINE, Vol. XXIV, pp. 601-11; and VITICULTURE, in these Revisions and Additions.

GRAPPLE-PLANT (*Uncaria procumbens*), a procumbent plant of the same genus with the Gambir, a native of South Africa. The seed vessel has many hooked thorns, and clings most tenaciously to any animal—a provision for the distribution of the seed. When it lays hold of the mouth of an ox, Livingstone says, the animal stands and roars with pain and a sense of helplessness.

GRAPTOLITES, a name given to a group of fossils, commonly supposed to be hydrozoans, and allied to the living sertularians. They usually appear as impressions on the shales of the Silurian rocks.

GRASS-CLOTH, a name sometimes given to different kinds of coarse cloth, whose fiber is rarely that of a grass. Cloth is made from bamboo, and a coarse matting is made from esparto, both true grasses. A fine cloth is woven from the fiber of a species of *Behmeria*, popularly called China-grass, but the plant is really a nettle. To the nettle order also belongs the so-called Queensland grass-cloth plant (*Pipturus argenteus*), which yields a fine strong fiber.

GRASSE, JOHANN GEORG THEODOR, an eminent German biographer, was born at Grimma, in Saxony,

* For a more extended biography, the reader is referred to the following: *Personal Memoirs of U. S. Grant*, Written by Himself, 2 vols., 1885-6; *Military History of Ulysses S. Grant*, by Adam Badeau, 3 vols., New York, 1867-81; *Life and Public Services of General U. S. Grant*, by James Grant Wilson, 1888; *The Ancestry of General Grant and their Contemporaries*, by Edward C. Marshall, 1869; and *Around the World With General Grant*, by John Russell Young, 1880.

in 1814, died at Dresden, September, 1885. He studied philology at Leipsic, was afterwards engaged in teaching at Dresden, but in 1843 was made librarian of King Friedrich-August II. In 1871 he became sole director of the "Geeen Vault," with its celebrated collection of jewels, gold, silver, and curios. From 1837 to 1860 he published a large work entitled *Lehrbuch einer allgemeinen Literaturgeschichte aller bekannten Völker der Welt*, wherein he collected and arranged a great mass of bibliographical material. His *Handbuch der allgemeinen Literaturgeschichte* is a compendium of the larger work. He also very diligently studied the myths and legends of the Middle Ages, and wrote several books on these subjects. Besides these works he published treatises on hunting, on beer, on porcelain, on ancient coins, on surnames and Christian names, on Latin names, etc., and published in 1876 a popular history of Saxony.

GRASSE, FRANÇOIS JOSEPH PAUL, COMTE DE, a French admiral, born at Valette, Provence, in 1723, died at Paris, Jan. 11, 1788. He was first in the navy of the Knights of Malta (1734), when he fought against the Turks. In 1749 he passed

into the service of France; but, while on a convoy to the East Indies, he was captured by a British admiral and imprisoned in England for two years. In 1762 he became a captain, and when France came to the assistance of America in 1778 he was made a rear-admiral. In March, 1781, De Grasse set out from Brest with a large fleet, conveying also a large land force to the United States. In June he assisted at the taking of Tobago, and then sailed to the mouth of the Chesapeake, in order to assist in the operations against Lord Cornwallis. The British admirals endeavored in vain to drive him from his position; and Cornwallis, shut up in Yorktown, was obliged to surrender to Washington, Oct. 19, 1781. De Grasse received the thanks of Congress for his share in this decisive victory. In January, 1782, he captured from the British the island of St. Christopher, in the West Indies. But on April 12 of the same year, after a gallant fight with Rodney near Jamaica, De Grasse was taken prisoner and conveyed to London. There he assisted in the negotiations relating to the peace of 1783, by which the Independence of the United States was acknowledged.

GRASSES AND OTHER FORAGE PLANTS. For an elaborate botanical description of GRASSES, see *Britannica*, Vol. XI. pp. 53-60. Grasses (*Gramineæ*) are widely distributed from equatorial to arctic regions, some genera being especially abundant in the tropics, but the majority belonging to the temperate zones. In the number of individuals they probably exceed all other flowering plants, while in the number of species the family stands third, the first and second places belonging to *Compositæ* and *Leguminosæ*. In usefulness to man they easily take the first rank, as they are the foundation of all agriculture, their herbage affording the larger share of the food of animals, while their seeds supply, in the cereal grains, the chief food of the world. Rice, durra, maize, wheat, rye, oats, barley, and sugar-cane need only to be mentioned to show the economical importance of the family. It is a singular fact that the most useful, those which furnish the cereal grains, are none of them known with certainty in the wild state, even their native countries being in doubt. But few grasses present marked properties. *Anthroxanthum*, *Hierochloa* and a few others have a pleasant vanilla-like odor, due to a principle like *coumarin*. Some Oriental species of *Andropogon* afford in their foliage the oils of lemon-grass, citronella and geranium, and from the roots of another species is obtained the perfume "vetiver." The rhizomes of *Triticum repens* and of *Cynodon dactylon* have long had a reputation for usefulness in diseases of the bladder. The many uses which the stems of species of *Bambusa*, the bamboos, are made to serve in China and other Eastern countries, give them a high rank among the useful grasses. In ornamental gardening, besides furnishing the carpet of verdure, without which our gardens would lose much of their attractiveness, grasses play an important part. From the humble *Festuca glauca*, the striking blue foliage of which is used for edgings, up to the stately *Gynerium argenteum*, the pampas-grass, the list of ornamental species and varieties is a long one (*BOTANY OF CALIFORNIA*, *Britannica*, Vol. II, p. 254).

The term grass is applied to all those plants which are used for pastures and meadows—a classification founded upon use alone, disregarding the

distinctive features of the plants. A true grass is an endogenous plant having simple leaves, a stem generally jointed and tubular, the husks or glumes in pairs, and the seed single. This definition includes, wheat, rye, oats, etc., and excludes clover and some other plants commonly called by the name of grass. In this article, however, the principal forage plants, other than true grasses, which are employed in agriculture, are treated of. With respect to grasses and forage plants adapted to different sections of the United States little is known. There are many climates, many kinds of soil, and many degrees of aridity and moisture; and consequently one species of grass cannot be equally adapted to all parts of this extensive territory; yet hardly a dozen species have been successfully introduced into agriculture. This number answers with a tolerable degree of satisfaction the wants of quite an extensive portion of the country, chiefly the northern and cooler regions; but in other localities the same kinds of grasses do not succeed equally well. This is particularly the case in the southern and southwestern States, the arid districts of the West and in California. The grasses which are in cultivation were once wild, and are still such in their native homes. Undoubtedly some kinds could be selected from the wild or native species which would be adapted to cultivation in those portions of the country which are not provided with suitable kinds. The solution of the question is largely a matter of experiment and observation.

The kinds of grasses now cultivated in this country are generally (1) red clover (*Trifolium pratense*); (2) white or Dutch clover (*T. repens*); (3) timothy (*Phleum pratense*); (4) blue grass (*Poa pratensis*); (5) wire grass (*Poa compressa*); (6) red top (*Agrostis vulgaris*); (7) orchard grass (*Dactylis glomerata*); (8) fowl meadow grass (*Poa serotina*); and (9) meadow fescue (*Festuca pratensis*). For feeding during droughts, Indian corn, sown at the rate of two bushels per acre, in drills two feet apart, cultivated thoroughly, once or twice, and cut when in blossom will make a good reliance, as also will German millet (*Panicum Germanicum*), and common millet (*P. miliaceum*). Above are designated nine species of forage plants that do well

generally. One, two, three, four, five and six constitute the bulk cultivated for pasture; and one and three for hay. Number seven is one of the most valuable in the whole list, and should be tried everywhere, on land not wet. Eight and nine are also well worthy of trial; fowl meadow grass especially has been found to take the place of blue grass in those sections of the Northwest where blue grass does not succeed. The hay is especially valuable for horses, it having all the advantages of wild hay, being free from the dust that infests timothy and clover, while it possesses all the nutriment of the best tame hay; and those dairymen who are acquainted with it pronounce it valuable hay for milch cows. Meadows of timothy alone are also very common, and when well managed are very satisfactory and profitable. It is also very common to combine red clover with timothy in various proportions. In low, wet meadows redtop is considerably employed, and it is a common constituent of pastures in all the Northern States. Some species of grass are adapted to clay lands, some to sandy soils, some to loam, some to dry upland, and some to low land; but for land of uniform quality it is believed that a mixture of five or six suitable varieties will yield a larger crop than one alone. The mixture of several varieties is perhaps most valuable in land that is designated for pasturage, as then they reach maturity at different times and furnish a succession of good feed, and also cover more completely and uniformly the ground. For a permanent pasturage under most circumstances the following kinds in proper proportions make a good mixture: June grass (blue grass), fox-tail (*Alopecurus pratensis*), redtop (bent grass), timothy, tall fescue, and perennial rye grass. For an immediate pasture the following mixture is generally satisfactory: Blue grass, 8 pounds; orchard grass, 4 pounds; timothy, 4 pounds; red clover, 6 pounds.

In all new countries the dependence must, of course, be first upon the wild grasses. As a rule these have not been sufficiently appreciated. Many of them are of exceeding value, but unfortunately are, as a rule, sparse seeders, and hence are apt to be neglected. The trouble is that farmers, as a class, do not investigate and experiment enough for themselves. Thus they are content with the most meager list of grasses, and, as a result, for a good part of the season their stock find insufficient food of proper succulence, and oftentimes are really distressed for subsistence.

There are many native and indigenous grasses in the West. There are sixty-five true grasses, excluding cereal grains and clovers, found on the Michigan Agricultural Farm, the most of them indigenous. In Illinois there have been found 105 native grasses (none peculiar to the State), eleven introduced, and twelve that are known as they are cultivated; a larger number, in proportion to the whole number of flowering plants in the State, than is usual in the same climate. This is owing to the extent and shape of Illinois, stretching from Lake Michigan to Kentucky. It has all soils, woods, prairie, and borders of lake and river.

On the native prairies may be found many species intermingled, each doing its part, some preferring low, wet situations, others growing only on wet ground; some prefer the shade of forest trees, while others flourish best on the most exposed parts of the broad prairies; some grow only in the water, others along the margins of lakes and streams; some attain their maturity early in the season, others late in autumn. Only through strenuous investigation and numerous trials will the farmer succeed in discovering the best species of grass for his farm and the support of his stock.

The clover family (order *Leguminosae*) embraces an immense number of plants of varying character, some small and insignificant, some trees of large size. Many of the most useful vegetable products are obtained from this order, which is characterized by having alternate, usually compound leaves, with stipules; flowers, polypetalous, the calyx mostly five-lobed, the corolla generally with five irregular petals, usually ten stamens, sometimes five, or many, usually united by the filaments, or nine united and one free, or sometimes all

distinct; the ovary, a one-celled carpel, becoming a legume or pod with few or many seeds, the pod sometimes marked into joints called *lomentis*. The genus *Trifolium* is one of the most useful of the order, and embraces a large number of species, several of which are well known in cultivation. The genus is characterized by having the leaves mostly trifoliate; that is, made up of three leaflets at the end of the leaf-stalk; some species have five or more leaflets, either close together at the end of the leaf-stalk or somewhat scattered in opposite pairs. The flowers are collected in roundish or oblong heads, with or without a general involucre. The calyx is five-toothed, the petals five, irregular, persistent; nine stamens united and one free; the pods small, mostly inclosed in the calyx, and one to four seeded. Among the specimens of this genus are: *Trifolium pratense* (red clover; common clover); *T. medium* (mammoth clover); *T. hybridum* (pl.; alsike clover); *T. incarnatum* (pl.; French clover); *T. repens* (white clover; Dutch clover); and *T. stoloniferum* (pl.-running Buffalo clover). Other genera are *Onobrychis* (pl.-), *Medicago* (pl.-), *Desmodium* and *Lespedeza* (pl.-). As regards the value of clover, we quote a paragraph from the report on the agricultural grasses and forage plants of the United States for 1889: "No matter how managed, clover is a benefit; and whatever else he may do, the farmer who grows clover is making a farm better. It does not need cultivating; the long deep-reaching roots mellow and pulverize the soil as nothing else can. If it grows thriftily the top acts as mulch, seeding the ground and keeping it moist. A crop of two tons or more of clover plowed under or cut for hay can hardly fail to leave the ground better than it was before. It should be the farmer's aim to grow the largest possible crop of clover."

CHEMICAL COMPOSITION OF AMERICAN GRASSES.—Of late years considerable attention has been given to the chemical composition of grasses, and much information has been gained concerning their nutritive value. The determinations of the grasses given in the above list of those commonly cultivated in the United States will be found in the table on the following page.

The specimens are from various parts of the country, and grown under several conditions of soil and environment. The development in nearly every case was full bloom or shortly after, that being the period at which the grasses as a whole seem to be cut for hay. The analyses have been calculated for "dry substance," and also for fresh grass, where the amount of water in the fresh grass had previously been determined; otherwise for the amount of water in hay. The great variation in composition of grasses becomes apparent on examining a table of one hundred and thirty-six analyses given in the special bulletin of the United States Department of Agriculture on the agricultural grasses and forage plants of the United States for 1889. The highest and lowest determinations, selected from this table, are shown in the following list of extremes:

Dry Substance.	High-est.	Low-est.
Ash.....	19.24	3.57
Fat.....	5.77	1.43
Nitrogen-free extract.....	66.01	34.01
Crude fiber.....	37.72	17.68
Albuminoids.....	23.13	2.89
Nitrogen.....	3.70	.45
Non-albuminoid nitrogen.....	1.64	.00
Per cent. of nitrogen as now albuminoid.....	60.70	.00
Water in fresh grass.....	76.50	60.00

The highest ash is undoubtedly owing to the presence of adherent soil, and the lowest carbohydrates are dependent relatively on the same cause. The wide variations in fiber and albuminoids must be regarded, however, as being entirely due to physiological causes which are difficult to explain. Species are not in themselves at all fixed in their composition, there being as large variations among specimens of the same as between specimens of different species. For illustration, several analyses of *Phleum pratense* in full bloom from widely separate localities are given in the following tables:

Soil and Stages of Growth.	When cut.	Height in centimeters.	Ash.	Fat.	Nitrogen-free extract.	Crude fiber.	Albuminoids.	Total nitrogen.	Non-albuminoid nitrogen.	Per cent. of nitrogen, non-albuminoid.	Water.	Ash.	Fat.	Nitrogen-free extract.	Crude fiber.	Albuminoids.
Good soil:																
Spike invisible.....	June 1	42	8.68	4.56	54.31	19.91	12.54	2.01	1.70	35.0	70.7	2.54	1.34	15.92	5.83	3.67
Spike visible.....	June 1	62	6.41	3.40	57.26	21.03	11.90	1.86	.55	29.5	71.9	1.80	.96	16.09	5.91	3.34
Before bloom.....	June 23	45	9.82	3.63	54.19	22.03	10.33	1.65	.36	21.8	67.5	3.19	1.18	17.61	7.16	3.36
In early bloom.....	June 23	60	6.04	3.85	57.21	22.70	10.20	1.63	.30	18.4	64.9	2.12	1.35	20.08	7.97	3.58
In full bloom.....	June 18	58	5.66	3.58	58.93	21.93	9.90	1.58	.38	24.0	67.2	1.86	1.17	19.33	7.19	3.25
Early seed.....	June 18	52	10.53	3.40	51.07	22.90	12.10	1.93	.51	26.4	77.8	2.34	.76	11.84	5.08	2.68
Poorer soil:																
In bloom.....	June 4	60	6.56	3.95	57.48	23.53	8.48	1.36	.30	22.0	63.4	2.40	1.45	21.04	8.61	3.19
In full bloom.....	July 1	70	5.64	2.93	61.03	22.84	7.46	1.19	.36	30.3	71.9	1.53	.84	17.16	6.42	2.10

CULTIVATION OF GRASSES.—In regard to their cultivation and study by farmers, a practical authority on grasses says: Our meadows and pastures are capable of and require great improvement. We have on the one hand a market full of all kinds of grass seed and mixtures, none of which we are sure are good and many we know to be bad. On the other hand we have here and there in our fields already the grasses which are best suited to our soil and climate, but we have not even commonly accepted names for most of them, the few names we have being somewhat indefinite. Still fewer of them do we know by their looks and habits throughout the growing season. It follows that we have a great deal to learn of the varieties of grass.

All this should be changed. Our granges and farmers' clubs must be places for naming grasses and learning their uses. The experiment station can cooperate by receiving, cultivating and studying varieties that promise remarkably well, propagating from the root, and when the merit of a variety is established, raising seed from it and testing it on a large scale. Any farmer who will take the time can do this work as well as the station perhaps. Finally, we should leave our old pastures with a solid turf, that is, give the turf which has been establishing itself for years and has already got the enduring grasses in it, a chance by clearing it of bushes and weeds and saving it both from the plow and from neglect.

GRASS-MOTH (*Crabrus*), a genus of small moths, allied to the clothes-moth. The species, which are numerous, inhabit pastures. Their form, when their wings are closed, is long and narrow, pointed at the head, abruptly cut off at the opposite end. They are often brown and white, sometimes silvery and golden.

GRASS OF PARNASSUS (*Parnassia*), a genus of plants belonging to the natural order *Saxifragaceæ*. It is a native of bogs and moist heaths in Britain, Northern Europe and Russian Asia, becoming a mountain plant in Southern Europe and West-central Asia. The calyx is deeply five-cleft, the petals white, five in number, and there are five perfect and five imperfect stamens, the latter bear-

ing instead of anthers a tuft of ten to twelve globular-headed hairs. There are several other species, natives of Asia and North America.

GRASS-OIL, a name under which several volatile oils derived from widely different plants are grouped. The grass-oil obtained from the leaves of *Andropogon warancusa* is used for rheumatism. Ginger-grass oil is obtained from *A. nardus*, a native of India. Geranium oil, derived from *Pelargonium radula*, is used like ginger-grass oil. Turkish-grass oil is obtained from *A. pachnodes*, indigenous to India, Persia and Arabia. Lemon-grass oil, or citronella oil, is derived from *A. schænanthus*, indigenous to India and cultivated in Ceylon. It is largely used for scenting soap. Cyperus-grass oil is extracted from the tubers of *Cyperus esculentus*, indigenous to Southern Europe, and is used as a table oil and in the manufacture of soap.

GRASS-TREE (*Xanthorrhæa*), a genus of plants of the natural order *Liliaceæ*, natives of Australia. They have shrubby stems, with tufts of long, wiry foliage at the summit, a long cylindrical spike of densely aggregated flowers shooting up from the center of the tuft of leaves. The base of the inner leaves of some species is edible. All the species abound in a resinous juice, which, on exposure to the air, hardens into a reddish-yellow inodorous substance, soluble in alcohol, and useful as a tonic in dysentery, diarrhœa, etc. The common grass-tree (*X. hastilis*) has a stem about four feet high, but sometimes a foot in diameter. It is of extremely slow growth. Several species are found in Eastern Australia and also in New Zealand.

GRASSUM: in the law of Scotland, a sum paid on taking a lease of landed property. In England the words "premium" in some cases, and "fine" in others, mean the same thing.

GRASS VALLEY, a post-town of Nevada county, Cal. It contains two orphan asylums, several schools, foundries and quartz mills. This place is the center of the chief gold quartz-mining district of California. Pop. (1890), 4,032.

GRASSWRACK (*Zostera*), a genus of plants of the natural order *Naiadaceæ*, belonging to the

genera found at the bottom of the sea. The leaves are narrow and grass-like, and the flowers consist of stamens and pistils, without any perianth, inserted on the central nerve of one side of a flat, thin linear *spadix*, with a leafy *spathe*. The pollen is confervoid. The common grasswreck (*Z. marina*) is a perennial plant, which forms green meadows on the bottom of almost all European seas. It becomes white by exposure to air. The rush-like coverings of Italian liquor flasks are made of it, and it is used for packing glass bottles. The plant is now an article of commerce under the name of *Alga marina*.

GRATIAN, a Benedictine monk, who at Bologna, between 1139 and 1142, compiled the *Decretum Gratiani*.

GRATIOLA, a genus of plants of the natural order *Scrophulariaceæ*. *G. officinalis*, sometimes called hedge hyssop, is found in pastures in most parts of Europe. It is extremely bitter, acts violently as a purgative, diuretic and emetic, and in overdoses is an acrid poison. It was formerly so highly esteemed as a medicine that the name of *Gratia Dei* ("Grace of God") was given to it, and for the same reason it is known as *Herbe-au-Pauvre Homme* ("Poor Man's Herb"). *G. Peruviana*, a South American species, has somewhat similar properties. These properties are supposed to depend upon a resinous principle called *Gratiolin*.

GRATRY, AUGUSTE JOSEPH ALPHONSE, ABBÉ, a French theologian, born at Lille in 1805, died at Montreux, Switzerland, Feb. 6, 1872. After being educated at the École Polytechnique he became an ecclesiastic, and was in 1841 appointed director of the Collège Stanislas, Paris. In 1846 he was made chaplain of the normal school, Paris. In 1852 Gratry joined the Abbé Petetot in reorganizing the order of the Oratorians of the Immaculate Conception, having previously resigned his position in the normal school. In 1861 Bishop Dupanloup appointed him vicar-general of Orleans, and in 1863 he was made professor of Christian morals at the Sorbonne, Paris. Gratry had then already published a course of philosophy entitled *De la Connaissance de Dieu; De la Connaissance de l'Âme; Logique*, and several other philosophical works. He wrote and spoke against M. Renan in defense of the authenticity and truth of the Gospels, and his eloquence procured his election to the French Academy in 1867. Being censured by the superior of his order for his connection with Père Hyacinthe and the League of Peace, which advocates religious tolerance, Gratry retired from the Oratorians. *La Morale et la Loi de l'Histoire* is his latest work of importance. He declares therein that the French Revolution is a true regeneration of human society.

GRATTAN, THOMAS COLLEY, British author, born in Dublin, Ireland, in 1796, died in London, England, July 4, 1864. He studied law in Dublin, but afterward devoted himself chiefly to literature. In 1828 he went to Belgium and settled in Brussels, where he actively supported the pretensions of King Leopold to the throne of Belgium. He was British consul at Boston in 1839-53, and subsequently held an office in the Queen's household. He published a pamphlet on the boundary question between Great Britain and the United States, and an attack on American society and institutions, entitled *Civilized America* (2 vols., London, 1859). He also published *The Woman of Color*; and *England and the Disrupted States of America* (1861).

GRATUITOUS DEED: in the law of Scotland, a deed granted without any value received. Such

deeds, if made after the contracting of debt and in favor of a near relation or confidential friend, are presumed to be fraudulent and so null.

GRAY, ALBERT ZABRISKIE, born in New York city, March 2, 1840, graduated at the University of New York in 1860, and at the general theological seminary of the Protestant Episcopal church in 1864. He served as chaplain of the 4th Massachusetts cavalry during the civil war; subsequently held various pastorates, and in 1882 was elected warden of Racine College, Wisconsin. He was engaged in the work of church reform in Europe, and was a delegate to the general convention in 1886. Among his writings are *The Land and the Life* (1876); *Mexico As It Is* (1878); *Words of the Cross* (1880); and *Jesus Only, and Other Sacred Songs* (1882). He died Feb. 16, 1889.

GRAY, ASA, an American botanist, born in Paris, Oneida county, N. Y., Nov. 18, 1810, died in Cambridge, Mass., Jan. 30, 1888. He received his degree of M. D. in 1831, but soon devoted himself to the study of botany with the late Professor Torrey, of New York. In 1834 he received the appointment of botanist to the United States exploring expedition to the Southern seas, but declined the post. In 1842 he became Fisher professor of natural history at Harvard, from the active duties of which position he retired in 1873. In 1874 he succeeded Agassiz as a regent of the Smithsonian Institution. Dr. Gray was recognized throughout the scientific world as one of the leading botanists of the age, and was a member of the principal learned societies of both America and Europe. He was the first in America, in conjunction with Dr. John Torrey, to arrange the heterogeneous assemblage of species upon the natural basis of affinity; and he was an influential supporter of the Darwinian theories of evolution. Professor Gray published an admirable series of text-books, which are used extensively throughout the United States, and have passed through many editions. In 1838 he commenced, with Dr. Torrey, the unfinished *Flora of North America*.

GRAY, ELISHA, an American inventor, born at Barneville, Ohio, Aug. 2, 1835. He studied at Oberlin College, meanwhile supporting himself by working as a carpenter. His patents number about 50, a large number of which relate to the telephone, and the remainder to telegraphic apparatus. Among them are a speaking telephone and a multiplex telegraph. In 1893 he announced his invention of the teleautograph, by which autograph messages may be transmitted by electricity.

GRAY, HENRY PETERS, artist, was born in New York city in 1819, and died there in 1877. From 1869 to 1871 he was president of the National Academy, and he produced a large number of historical paintings and portraits.

GRAY, HORACE, born in Boston, Mass., in 1828; became a lawyer in 1851, and in succession reporter, associate, and chief justice of the Supreme Court of the State. In 1882 he was made associate justice of the United States Supreme Court, which position he now (1893) holds.

GRAY, ISAAC PUSEY, an ex-governor of Indiana, was born Oct. 18, 1828, in Chester county, Pa. He practiced law and served during the civil war. His political opinions have been varied, but in 1871 he attached himself to the Democratic party. He became a State senator in 1868, lieutenant-governor in 1876, and was elected governor in 1884. In March, 1893, he was sent as minister to Mexico.

GRAY, ROBERT, discoverer, born at Tiverton, R. I., in 1755, died in Charleston, S. C., in 1806. In September, 1787, he sailed from Boston in command of the sloop *Washington*, for the purpose of trading

with the natives of the northwest coast, and returned in 1790 by way of Canton, China; thus being the first man to carry the American flag around the globe. He made a second voyage, and on May 11, 1791, discovered the mouth of the great river which is now called Columbia.

GRAYDON, ALEXANDER, born in Bristol, Pa., April 10, 1752, died in Philadelphia, May 2, 1818. He was educated in Philadelphia, and studied law, but in 1775 received the appointment of captain and engaged in raising recruits for the army. He was in the battle of Long Island, and was taken prisoner in a subsequent action. He was exchanged in 1778, but did not rejoin the army. He was prothonotary of Dauphin county, Pa., 1785-99, resided for some years near Harrisburg, and removed to Philadelphia in 1816. He was a contributor to literary and political journals, and published *Memoirs of a Life, Chiefly Passed in Pennsylvania, Within the Last Sixty Years* (Harrisburg, 1811, reprinted in London and Edinburgh).

GRAYLING. See *Britannica*, Vol. XI, p. 78.

GRAYLING, the capital of Crawford county, Mich., situated on the Au Sable River and on the Mackinaw division of the Michigan Central Railroad. It has several lumber mills.

GRAY'S INN, one of the four inns of court in London.

GRAY'S PEAK, Rocky Mountains, in Summit and Clear Creek counties, Colo., 12 miles west of Georgetown. It is the twin of Torrey's Peak and of the same height, 14,466 feet. It was named in honor of Dr. Asa Gray.

GRAYVILLE, a town of White county, Ill., situated on the Wabash River at the mouth of the Bonpas River, and on the Cairo and Vincennes Railroad. The surrounding country is fertile, and considerable grain is shipped. Population, 2,000.

GRAYWACKE: in geology, a sort of conglomerate rock, found chiefly in the Palaeozoic series. The term has been little used since the establishment of the Silurian system.

GREASE, a term of general application to all fatty matters, but generally to those having some degree of solidity. It is mostly applied to fatty substances so deteriorated by dirt or other impurities as to be unfit for candle-making and other manufactures requiring some degree of purity in the material. Grease is largely employed as a lubricant for heavy machinery. The grease employed for the axles of wagons and carts consists of inferior kinds of grease mixed with a little tar.

GREASE-WOOD, a name applied to various chenopodiaceous shrubs growing abundantly in saline localities in the Western United States.

GREAT BARRINGTON, a village of Berkshire county, Mass., beautifully situated and noted as a summer resort. It has manufactories of woollens, cotton goods, paper, and brick. Population, 4,612.

GREAT BASIN, a vast elevated plateau stretching 500 miles between the Sierra Nevada and Cascade Mountains on the west, and the Wahsatch Range of the Rocky Mountains on the east. It is crossed by about one hundred short mountain ranges, which traverse it mostly in a southerly direction. North of it the country is drained by the Columbia River into the Pacific Ocean, and east of it by the Colorado River into the Gulf of California. The Great Basin itself has no outlet whatever.

The whole country is a desert like the Sahara, but more mountainous, rocky and desolate. Months pass without any rain. In most parts the entire yearly rainfall amounts to scarcely 4 inches. On account of the exceeding dryness no part of this region can be cultivated without irrigation, except some small

strips of land along the Humboldt and Carson Rivers. Most of its valleys, which are as a rule wide and open, have no rivers, except the small, narrow rivulets that rush down from the melting snows of the neighboring mountains. These rivulets rapidly disappear on reaching the plains, either by evaporation from the soil or by finding their way into one of the many small lakes and sinks which dot the surface. The waters of these lakes are generally salt, bitter, and unfit to drink for man or beast.

The area of the Great Basin is as large as France, and nearly five times as large as the State of Pennsylvania. It reaches from the northern boundaries of the States of Nevada and California down to the northern end of the peninsula of Lower California, a distance of nearly 600 miles. Most of it belongs to the States of Nevada and California and the Territory of Utah. A portion of this basin, north of the Mud Lake, reaches up into the State of Oregon, as far as 44° N. lat. Almost the whole State of Nevada lies in the Great Basin.

The northern portion of the Great Basin is the more mountainous and elevated. Here the valleys are usually 5,000 feet above sea-level, while the mountains rise to 10,000 or 12,000 feet. They become gradually lower as we go south; larger patches of country become flat, until we find in the southern portion valleys that are even lower than the level of the sea. Such are the Death and Coahuila Valleys.

MOUNTAINS.—Most of the mountain ranges of the Great Basin are composed of huge blocks which have been lifted by subterranean forces, broken in various directions, and tilted up on one side or the other. They have one steep face, exposing the broken edges of the original rock strata, and one gently sloping side, the slope conformable to the dip of the strata. The *Wahsatch Range* in Utah, which forms the eastern boundary of the Great Basin, has a north and south direction, like most of the basin ranges. On its western side it presents a bold, abrupt escarpment facing Great Salt Lake, while on the more gently sloping eastern side it is covered by tertiary deposits. Its highest peaks are 12,000 feet high. South of the Wahsatch Mountains is a region of high plateaus—the highest in America. Their drainage is carried by the Sevier River into the Great Basin. To the west of the Sevier Valley lies a range of three high tables, the southernmost, the *Markagunt Plateau*, about 11,000 feet high. On the opposite side of the Sevier Valley are the *Sevier* and *Puavsaunt Plateaus*, the former a table 60 miles long. East of this is the long stretch of Grass Valley, the waters of which burst through a deep gorge in the *Sevier Plateau* and join the Sevier River. East of this are the *Wahsatch Plateau*, a southerly extension of the Wahsatch Mountains, the *Fish Lake Plateau*, the *Awapa* and *Aquarius Plateaus*. All of these are over 11,000 feet high, and the Aquarius Plateau is partly covered by a forest of pine and fir trees.

The main range of Central Nevada is the *East Humboldt Range*, a single bold ridge 80 miles long, terminating at the Humboldt River, with many rugged summits over 10,000 feet high. Mount Bonplant at the northern end rises even 11,320 feet above sea level. Its long slopes carry pine forests. Westward of the East Humboldt lie the *Augusta*, *Carson Sink* and *West Humboldt Ranges*, the latter culminating in Star Peak, 9,920 feet high, and the *Virginia Range*, which latter is the first of the north and south ranges lying east of the Sierra Nevada. The Virginia Range is 150 miles long.

Besides the mountain ranges named there are nearly one hundred smaller ranges in the Great

Basin. In Southern Nevada and Southeastern California there are the *Amargosa* and *Funeral Mountains*, east of Death Valley; the *Panamint Range* west of that valley, and the *Inyo Range* just east of the Sierra Nevada, which it almost rivals in grandeur and exceeds in dreariness. South of the Inyo and Panamint ranges are the *Opal*, *Payute* and *Dead Mountains*, which are scarcely 5,000 to 6,000 feet high, and south of these the *Chocolate*, *Chuwavalla* and *Riverside Mountains*, which hardly average 4,000 feet.

VALLEYS.—The valleys between the ranges are more barren and desolate than the mountains. They are generally destitute of trees, because they are mostly destitute of water in summer. In some places we find sage-brush, more seldom bunch-grass, covering large level patches of ground. Here and there we find a snow-white alkaline flat without any vegetation whatever. The soil in these valleys is formed by alluvial deposits, and can very often be identified as the beds of ancient lakes of large extent. Some parts of these mud plains become so baked by the solar heat in summer that horses' hoofs leave no tracks, and so cracked in all directions as to look like mosaic-work. The alkaline dust, caught up by the wind, sometimes forms hollow columns two to three thousand feet high, and is at all times most vexatious to the eyes of travelers.

The *Carson* and *Black Rock Deserts* of Northern Nevada and the desert west of great Salt Lake exhibit the extreme of desolation and dreariness, but they are surpassed in area by the *Mohave Desert* in Southern California. *Amargosa Desert*, or *Death Valley*, lies in the southeastern part of Inyo county, Cal., and is 60 miles long and from 10 to 15 miles wide. Its lowest point is known as Benneetts Wells. It is 300 feet below the level of the sea, while the highest point of the Telescope range, just west of the valley, rises 11,000 feet above sea level. Furnace Wash, a small stream, enters Death Valley near its northern end. As it descends it forms a great swamp that spreads over a large portion of the valley, and gives off a fearful odor of sulphureted hydrogen. One sinks down to one's knees in walking over this swamp. Right above it is a salt crust a foot thick, surmounted by rough pinacles of saline efflorescence.

As we move away from this marsh and up the mountain side we meet a growth of salt grass so strongly saline that the horses will not eat it. Then comes the mosquito brush, consisting of big bushes covered with long poisonous thorns. A sage brush is next in order, and finally on the mountain tops grows a sort of stunted pine.

The animal life of Death Valley is very small. Besides the coyote we find rattlesnakes, lizards, scorpions and tarantulas. No birds are to be seen, except once in a while a few crows looking for perishing travelers. Rains are almost unknown to this region. The air is so dry that men venturing into the valley without carrying a large supply of water in barrels will soon die of thirst. This happened to parties of immigrants and explorers, and has given the valley its name. In 1850 thirty pioneers left Salt Lake City for California. They attempted to pass this valley at the north end. Soon their water gave out. They abandoned their teams and wandered for days without finding a stream of drinkable water. Then, parched with thirst, physically exhausted and mentally deranged, they lay down beneath the blazing sun and died.

The thermometer rises in summer often to 130° F. in the shade, so that this region is the hottest spot on earth, as it is the most desolate and for-

bidding. Wet clothes wrung out of water and hung up to dry in summer will have every stitch dried in 25 minutes. This excessive dryness makes it impossible for any vegetation to exist in Death Valley.

LAKES AND RIVERS.—Numerous small lakes in the mountains are fed by springs and melting snow. Their water is pure and fresh. The finest of these is *Lake Tahoe*, a beautiful sheet of water, which lies amid the peaks of the Sierra Nevada over 6,240 feet high. Its outlet, the Truckee River, flows northward into the *Pyramid Lake*, which is less than 4,000 feet high. *Lake Tahoe* is one of the deepest lakes in this country (1,645 feet), and abounds in fish. It is 21 miles long by 12 miles wide.

On the eastern side of the Great Basin lie *Utah Lake*, which discharges its waters through the Jordan into great Salt Lake, Utah, and *Bear Lake*, whose surplus waters are conveyed by Bear River into the same reservoir. *Great Salt Lake* is exceedingly saline and bitter. It is nearly 90 miles long by 32 miles wide at its greatest width, covering a surface of 2,360 square miles. Its greatest depth is 50 feet, but the greater part is scarcely 10 feet deep. The Bear, Ogden, Weber and Jordan Rivers feed this lake; but it has no outlet whatever. Its water contains about 15 per cent. of mineral matter, and is therefore so dense that the human body floats on it like a cork. Common salt forms nearly four-fifths of the solid contents; the remaining fifth is made up by chloride of magnesium as the principal ingredient, and the sulphates of sodium and potassium, with a trace of sulphate of lime. The lake is slowly rising since 1861.

Lake Mono is in California, a little south of Virginia City. It is 14 miles by 10, and has no outlet. Its water is strongly charged with sodium carbonate, and contains smaller quantities of lime carbonate, common salt and borax. Masses of tufa surround *Lake Mono*. They have been deposited from the lime carbonate formerly held in solution by the water. Near the center of the lake is a group of volcanic islands. Prof. Le Conte, upon his visit to this lake in 1872, found ample proof that it had risen 10 or 12 feet in about as many years.

Pyramid and *Willamucca Lakes*, although they have no outlets, are only slightly saline. Both of them are rising, the latter as much as 22 feet in as many years. *Owen's Lake* is between the Sierra Nevada Mountains and the Inyo range. Its saltiness is about twice that of sea-water. Sodium carbonate and common salt, in equal parts, are the chief saline ingredients, but potassium and sodium sulphates are also present. The *Humboldt* and *Carson Rivers* feed the *Humboldt* and *Carson sinks* or lakes, which have no outlets. They are the remains of the former *Lake Lahontan*. *Silver Lake*, north of *Lake Lahontan*, is the only fresh-water lake in the central part of the Great Basin. It is small, only 10 feet deep, and has no outlet. The numerous other lakes are alkaline and brackish; only a few of them contain water fit for stock to drink.

Summer and *Albert Lakes* are strong solutions of potash and soda salts, the potassium salts of the latter lake amounting to 70 per cent. of the total mineral contents. Millions of brine-shrimps live in these two lakes. *Alvord*, *Guano*, *Massacre*, *Warner* and *Christmas Lakes*, as well as those of *Surprise* and *Long Valleys*, are very shallow, and most of them evaporate to dryness in summer. *Goose Lake*, the deepest, does not exceed 20 feet.

Quaternary Lakes.—During the Glacial period, which covered the Eastern and Northern States

with ice, the greater part of the Great Basin was occupied by a number of lakes. Twenty-four of these lakes have been explored, the largest being Lakes Bonneville and Lahontan, both in the northern half of the basin, and that which occupied Death Valley, in the southern half of it.

Lake Bonneville was the largest of the quaternary lakes. It covered the regions now occupied by the Great Salt Lake and the broad desert west of it, including the Utah and Sevier Lakes. The highest water-line of Lake Bonneville is 1,000 feet above the present level of Great Salt Lake, and is conspicuously marked, but the most prominent water-line is 400 feet lower, and has been named the Provo shore-line. The outlet of this lake was found at the northern end of Cache Valley, through which the water escaped into the Snake River, and by the latter into the Columbia River and Pacific Ocean.

Lake Lahontan included the regions of Pyramid, Willamucca, Humboldt, Walker and the two Carson Lakes, all in Nevada, and Honey Lake in California; also the Truckee and Humboldt Valleys, and what is now called the Carson and Black Rock Deserts.

The shore-lines of this ancient lake are clearly defined throughout, and its coasts are scored by several horizontal terraces, each cut by the waves at a period when the lake maintained about the same height. A terrace 200 to 300 feet wide on the south side of the Carson Desert marks a level at which Lake Lahontan stood for a long period. A hundred feet above the present level of Pyramid Lake is a distinctly cut terrace. Tufa deposits rise from the alluvial beds of the lake bottom to various heights. Remains of fresh-water shells prove that the water of Lake Lahontan was fresh at its earlier periods. But salts, chiefly common salt,

but including borate, sulphate and carbonate of soda, and also borate of lime, are contained in the lake-beds in quantities sufficient to pay for their being worked for salt and borax. These deposits prove that the lake was strongly saline at its later period.

The most important rivers are the *Jordan*, in Utah, flowing northwards into Great Salt Lake; the *Sevier* and *Bear Rivers*, also in Utah; the *Humboldt River*, in Nevada, which flows 350 miles in a southwesterly direction, and disappears in the shallow and brackish waters of the Humboldt Lake and sink; the *Truckee River*, which connects Lake Tahoe and Pyramid Lake; the *Carson River*, flowing from the Sierra Nevada Mountains down into Carson Lake and sink; and *Walker River*, rising in the same mountain range and losing itself in Walker Lake. None of these rivers are navigable. But they are very valuable for the purpose of irrigating the very dry country.

Of animals we find only the mountain sheep native, and some fishes in the mountain lakes. Trout are found in the upper portions of the rivers. In the southern valley there are many snakes and lizards, but none of these are found in the northern parts.

The agriculture of the Great Basin is limited to those few areas that can be irrigated. The grazing of sheep and cattle on the bunch grass, which is found in some of the mountains, is of greater importance. The principal source of wealth is mining. The silver mines of Virginia City, Nevada, have produced large quantities of silver. There is also a growing industry in mining borax, salt, sulphur and carbonate of soda.

GREAT BEND, a city and county-seat of Barton county, Kan., on Arkansas River, near the center of the State. Pop. (1890), 2,450.

GREAT BRITAIN—BRITISH EMPIRE. For elaborate articles on the geography, history, government, literature, and earlier statistics of Great Britain and the British Empire, see in the *Britannica* the countries, severally, which together constitute the present British Empire.

The total area of the Empire in 1890 was estimated at 11,355,057 square miles, with an estimated population of 366,642,105. Capital, London, with a population of 5,633,332.*

SOVEREIGN AND ROYAL FAMILY.—Victoria, Queen of Great Britain and Ireland, and Empress of India, was born May 24, 1819; the daughter of Edward, Duke of Kent, fourth son of King George III. and of Princess Victoria of Saxe-Saalfeld-Coburg, widow of Prince Emich of Leiningen. She ascended the throne at the death of her uncle, King William IV, June 20, 1837; was crowned at Westminster Abbey, June 28, 1838; was married Feb. 10, 1840, to Prince Albert of Saxe-Coburg-Gotha; widow, Dec. 14, 1861.

CHILDREN OF THE QUEEN.—I. Princess Victoria (Empress Frederick), born Nov. 21, 1840; married, Jan. 25, 1858, to Prince Friederich Wilhelm (Friedrich I of Germany), eldest son of Wilhelm I, German Emperor and King of Prussia; widow, 1888.

II. Albert Edward, Prince of Wales, born Nov. 9, 1841; married, March 10, 1863, to Princess Alexandra, eldest daughter of King Christian IX of Denmark. Five children: Albert Victor, born Jan. 8, 1864; George, born June 3, 1865; Louise, born Feb. 20,

1867; married to the Duke of Fife, July, 1889; Alexandra, born July 6, 1868; Maud, born Nov. 26, 1869. Albert Victor, Duke of Clarence, died Jan. 14, 1892.

III. Prince Alfred, Duke of Edinburgh, born Aug. 6, 1844; married, Jan. 21, 1874, to Grand-duchess Marie of Russia, only daughter of Emperor Alexander II. Five children: Alfred, born Oct. 15, 1874; Marie, born Oct. 29, 1875; Victoria, born Nov. 25, 1876; Alexandra, born Sept. 1, 1878; Beatrice, born April 20, 1884.

IV. Princess Helena, born May 25, 1846; married, July 5, 1866, to Prince Christian of Schleswig-Holstein. Four children: Christian, born April 14, 1867; Albert John, born Feb. 26, 1869; Victoria, born May 3, 1870; Louise, born Aug. 12, 1872.

V. Princess Louise, born March 18, 1848; married, March 21, 1871, to John, Marquis of Lorne, eldest son of the Duke of Argyll.

VI. Prince Arthur, Duke of Connaught, born May 1, 1850; married, March 13, 1879, to Princess Louise of Prussia, born July 25, 1860. Three children: Margaret Victoria, born Jan. 15, 1882; Arthur, born Jan. 18, 1883; Victoria, born March 17, 1886.

VII. Princess Beatrice, born April 14, 1857; married, July 29, 1885, to Prince Henry, third son of Prince Alexander of Battenberg, uncle of Ludwig IV, Grand-duke of Hesse. Three children: Alexander Albert, born Nov. 23, 1886; Victoria Eugénie, born Oct. 24, 1887; Leopold Arthur Lewis, born May 21, 1889; Donald, born October 3, 1891.

COUSINS OF THE QUEEN.—I. Prince Ernest August, Duke of Cumberland, born Sept. 21, 1845, the grandson of Duke Ernest August of Cumberland, fifth son of King George III; married Dec. 21,

*See "Statesman's Year-book" for 1892, p. 20.

1878, to Princess Thyra, of Denmark, born Sept. 29, 1853. Six children.

II. Prince *George*, Duke of Cambridge, born March 26, 1819, the son of Duke Adolph of Cambridge, the sixth son of King George III; field-marshal commander-in-chief of the British army.

III. Princess *Augusta*, sister of the preceding, born July 19, 1822; married, June 28, 1843, to Grand-duke Friedrich Wilhelm of Mecklenburg-Strelitz.

IV. Princess *Mary*, sister of the preceding, born Nov. 27, 1833; married, June 12, 1866, to Prince Franz von Teck, born Aug. 27, 1837, son of Prince Alexander of Württemberg. Four children: 1. Victoria, born May 26, 1867; 2. Albert, born Aug. 13, 1868; 3. Franz-Josef, born Jan. 9, 1870; 4. Alexander, born April 14, 1874.

ROYAL SUPPORT.—The civil list of the Queen consists in a fixed Parliamentary grant, and amounts to much less than the incomes of previous sovereigns. Under George I this sum amounted at times to £1,000,000 sterling, but in 1777 the civil list of the King was fixed at £900,000, and the income over and above that sum from the hereditary possessions of the crown passed to the treasury. Under William IV the civil list was relieved of many burdens, and fixed at £510,000.

It is established by law (1 & 2 Vict., ch. 2), that during her Majesty's reign all the revenues of the crown shall be a part of the consolidated fund, but that a civil list shall be assigned to the Queen.

In virtue of this act, the Queen has granted to her an annual allowance of £385,000, of which the lords of the treasury are directed to pay yearly £60,000 into her Majesty's privy purse; to set aside £237,260 for the salaries of the royal household; £44,240 for retiring allowances and pensions to servants; and £13,200 for royal bounty, alms, and special services. This leaves an unappropriated surplus of £36,300, which may be applied in aid of the general expenditure of her Majesty's court. The Queen has also paid to her the revenues of the duchy of Lancaster, which in the year 1888 amounted to £86,285, and the payment made to her Majesty for the year was £50,000.

On the consolidated fund are charged likewise the following sums allowed to members of the royal family:—£25,000 a year to the Duke of Edinburgh; £25,000 to the Duke of Connaught; £8,000 to the Empress Victoria of Germany; £6,000 to Princess Christian of Schleswig-Holstein; £6,000 to Princess Louise, Marchioness of Lorne; £6,000 to Princess Henry (Beatrice), of Battenberg; £3,000 to the Grand-duchess of Mecklenburg-Strelitz; £5,000 to Princess of Teck, formerly Princess Mary of Cambridge; £12,000 to George, Duke of Cambridge; and £6,000 to Princess Helena of Waldeck, Duchess of Albany.

The Prince of Wales, the heir-apparent to the crown, has (by 26 Vict., ch. 1) settled upon him an annuity of £40,000, and by an act passed in 1889 receives £37,000 annually in addition for the support and maintenance of his children. The Prince of Wales has besides as income the revenues of the duchy of Cornwall, which in the year 1888 was £90,022, exclusive of £855 of arrears, the sum paid to the Prince being £61,971. In the year 1884 the income from the duchy of Cornwall was £103,133, exclusive of £10,133 for arrears; in 1889 the income from the duchy was £104,188, exclusive of £9,413. The Princess of Wales has settled upon her the annual sum of £10,000, to be increased to £30,000 in case of widowhood.

CONSTITUTION AND GOVERNMENT.—The Queen holds the crown both by inheritance and election. Her legal title rests on the statute of 12 & 13

Wm. III, ch. 3, of the English laws, in which it was declared that the succession to the crown of Great Britain and Ireland was settled on the Princess Sophia of Hanover, and the "heirs of her body being Protestants."

The supreme legislative power of the British Empire is granted by the Constitution to Parliament. The powers of Parliament are politically controlling not only within the United Kingdom, but also in the colonies and dependencies. The Parliamentary authority extends to all "ecclesiastical, temporal, civil and military" matters, as well as to altering the Constitution of the realm. Parliament is the highest court of law.

The present form of Parliament, which dates from the middle of the 14th century, is that of two houses of legislature, the House of Lords and the House of Commons.

For the order of rank or precedence in all the departments of government under the prevalent conventional rules in English society, see an exhaustive article on PRECEDENCE, *Britannica*, Vol. XIX, pp. 660-68.

THE HOUSE OF LORDS.—The House of Lords consists of peers who hold their seats—1. By virtue of hereditary right; 2. By creation of the sovereign; 3. By virtue of office—bishops of the English established church; 4. By election for life—Irish peers; and 5. By election for duration of Parliament—Scottish peers.

The number of peers named on the "roll" in 1893 was 551, 12 of whom were recorded as minors.

About two-thirds of these hereditary peerages were created in the present century. Excluding the royal and ecclesiastical peerages, the four oldest existing peerages in the House of Lords date from the latter part of the thirteenth century, while five go back to the fourteenth and ten to the fifteenth century. In 1888 two new peerages were created, one in 1889 and one in 1890. There are besides five peeresses of the United Kingdom in their own right, and three Scotch peeresses, and 18 Scotch and sixty-three Irish peers who are not peers of Parliament.

The crown is not restricted in its power of creating peers, and this power has been liberally used to fill up the House of Lords. In consequence of certain provisions of the Act of Union, limiting the right of election of the Scottish representative peers to the then existing peers of Scotland, it is understood that the sovereign cannot create a new Scottish peerage, and such peerages are in fact not created except in the younger branches of the royal family, though extinct or forfeited peerages may be restored. The sovereign is restricted to the creation of one new Irish peerage on the extinction of three of the existing peerages; but when the number of Irish peerages are reduced to 100, then, on the extinction of one peerage, another may be created.

SPEAKER OF THE HOUSE OF LORDS.—The lord high chancellor, who is appointed by mere delivery of the "great seal" to him by the sovereign, and who is the principal legal adviser of the crown, is by prescription speaker of the House of Lords, and may act in that capacity even though he be not a peer. He is by virtue of his office a privy councillor, and as the first existing great officer of state he takes precedence of all but royal dukes and the archbishop of Canterbury. He presides, if present, when the House of Lords is sitting as an appellate court. He is president of the chancery division of the high court and of the court of appeal, and is one of the judicial committee of the Privy Council. In the absence of the sovereign he reads the Queen's speech at the opening and pro-

gation of Parliament, and he is always one of the commission for giving the royal assent to bills. He is visitor of all hospitals of royal foundation, the general guardian of all infants, idiots and lunatics, and has the general supervision of all charitable trusts. His patronage is very extensive. He nominates the puisne judges and county court judges; and, except for Lancashire, he appoints the county magistrates, generally accepting the nominations of the lords-lieutenant and the borough justices. He is the patron of twelve canons and over six hundred livings. On retiring from office he receives a pension of £5,000 a year, but in such a case he commonly assists the lord chancellor and the lords of appeal in ordinary in the transaction of the judicial business of the House of Lords. While in office he receives a salary of £10,000—£4,000 as speaker of the House of Lords and £6,000 as judge. The attorney-general receives a salary of £7,000 and fees (in 1886-87 £5,109), and the solicitor-general a salary of £6,000 and fees (in 1886-87 £2,553).

THE HOUSE OF COMMONS.—The Lower House of Parliament consists of knights of the shire, or representatives of counties; of citizens, or representatives of cities; and of burgesses or representatives of boroughs, all of whom vote together. The Representation act of 1884 and the Redistribution of Seats act of 1885—the former extending to householders in *counties* the suffrages which previously had been conferred upon householders and lodgers in *boroughs*, while the latter made a new division of the United Kingdom into county and borough constituencies. Thus a uniform household and lodger franchise was conferred on counties and boroughs. The Representation act of 1884 also introduced a "service franchise," and placed the three kingdoms on a footing of equality as regards electoral qualifications. The new Reform bill has added nearly three million of electors to the roll, and there is now one elector to about every six of the population. The present total number of members is 670, against 652 who sat before the passing of the Redistribution act. The classified lists showing the relative representation of England, Scotland and Ireland in the Lower House of Parliament from the counties, boroughs, and Universities in 1891 are as follows:

Territorial.	Co.	Bor.	Univ.
England.....	253	237	5
Scotland.....	39	31	2
Ireland.....	85	16	2
Total.....	377	284	9

All elections for members of Parliament must be by secret vote and ballot—an act being passed annually to this effect.

The sole qualification required to be a member of Parliament is to be twenty-one years of age. All clergymen of the church of England, ministers of the church of Scotland, and Roman Catholic clergymen are disqualified from sitting as members; all government contractors, and all sheriffs and returning officers for the localities for which they act are disqualified both from voting and from sitting as members. No English or Scottish peer can be elected to the House of Commons, but non-representative Irish peers are eligible.

In order to preserve the independence of the members of the Lower House of Parliament, it was

long since enacted that if any member shall accept any office of profit from the crown, his election to Parliament shall be void, and a writ for a new election must issue; but he is eligible for reelection if the place be "not a new office created since 1705."

SPEAKER OF THE HOUSE OF COMMONS.—On the first day of the meeting of a new Parliament members of the House of Commons are summoned from their own chamber to the House of Peers, where her Majesty's pleasure is signified by the lords-commissioner that they shall proceed to the choice of some proper person to be their speaker. On their return the Commons proceed to the election accordingly, the clerk acting the while as chairman. On the following day the speaker-elect, with the House, is summoned to the House of Peers, and one of the lords-commissioner signifies her Majesty's approval of the choice made by the Commons. The speaker then, in the name and on behalf of the Commons, lays claim to their ancient and undoubted rights and privileges, which being confirmed he and his fellow-members return to their own chamber and the ceremony of taking the oath is proceeded with, he being the first to go through it. The speaker may hold office until a dissolution. Should the office become vacant during a session, the new speaker then elected is presented for the royal approbation, but does not claim the privileges of the House. This great officer has a residence in the palace of Westminster, and receives a salary of £5,000 per annum; he ranks as first commoner, and is usually awarded upon retirement a pension of £4,000 and a peerage. There has been no contested election for speaker since 1839.

THE CABINET MINISTRY.—The Executive Government of Great Britain and Ireland is vested nominally in the crown; but practically in a committee of ministers, commonly called the cabinet, whose existence is dependent on the possession of a majority in the House of Commons.

The member of the cabinet who fills the position of first lord of the treasury is, as a rule, the chief of the ministry; the term "premier" usually applied to him, is not official. It is at the premier's recommendation that his colleagues are appointed; and he dispenses the greater portion of the patronage of the crown. His salary is that of the chair or office which he holds as head of a department. The present premier, Rt. Hon. W. E. Gladstone, receives £5,000.

Mr. Gladstone's present (his 4th) cabinet is composed as follows: Prime Minister, William Ewart Gladstone; Lord High Chancellor, Lord Herschell; Lord President of Council, Earl of Kimberley; Chancellor of the Exchequer, Sir William Vernon Harcourt; Secretary of State, Home Department, Herbert Henry Asquith, Q. C.; Secretary of State, Foreign Department, Earl of Roseberry; Secretary of State, Colonial Department, Marquis of Ripon; Secretary of State, War Department, Henry Campbell-Bannerman; Secretary for Scotland, Sir George Otto Tevelyan; First Lord of the Admiralty, Earl Spencer; Chief Secretary for Ireland, John Morley; Postmaster General, Arnold Morley; President Board of Trade, Anthony John Mundella; President Local Government Board, Henry Hartley Fowler; Chancellor Duchy of Lancaster, James Bryce; First Commissioner of Works, George John Shaw-Lefevre; V. P. Committee of Council, Arthur Herbert Dyke-Acland.

Although the cabinet ministry is not the offspring of any formal election, it is virtually dependent upon the House of Commons, as an adverse majority in that body on any of its acts requires its immediate resignation.

The following is a complete list of the premiers, or heads of all the cabinet administrations of the British government from accession of the house of Hanover to 1893, with the dates of their appointments:

Prime Ministers.	Dates of Appointment.	
Robert Walpole.....	Oct. 10, 1714	
James Stanhope.....	April 10, 1717	
Earl of Sunderland.....	March 16, 1718	
Sir Robert Walpole.....	April 30, 1720	
Earl of Wilmington.....	Feb. 11, 1742	
Henry Pelham.....	June 26, 1743	
Duke of Newcastle.....	April 21, 1754	
Earl of Bute.....	May 29, 1762	
George Grenville.....	April 16, 1763	
Marquis of Rockingham.....	July 12, 1765	
Duke of Grafton.....	August 2, 1766	
Lord North.....	Jan. 28, 1770	
Marquis of Rockingham.....	March 30, 1782	
Earl of Shelburne.....	July 8, 1783	
Duke of Portland.....	April 5, 1783	
William Pitt.....	Dec. 27, 1783	
Henry Addington.....	March 7, 1801	
William Pitt.....	May 12, 1804	
Lord Grenville.....	Jan. 8, 1806	
Duke of Portland.....	March 13, 1807	
Spencer Perceval.....	June 23, 1810	
Earl of Liverpool.....	June 8, 1812	
George Canning.....	April 11, 1827	
Viscount Goodrich.....	August 10, 1827	
Duke of Wellington.....	Jan. 11, 1828	
Earl Grey.....	Nov. 12, 1830	
Viscount Melbourne.....	July 14, 1834	
Sir Robert Peel.....	Dec. 10, 1834	
Viscount Melbourne.....	April 15, 1835	
Sir Robert Peel.....	Sept. 1, 1841	
Lord John Russell.....	July 3, 1846	
Earl of Derby.....	Feb. 27, 1852	
Earl of Aberdeen.....	Dec. 28, 1852	
Viscount Palmerston.....	Feb. 8, 1855	
Earl of Derby.....	June 13, 1859	
Viscount Palmerston.....	Nov. 6, 1865	
Earl Russell.....	July 6, 1866	
Earl of Derby.....	Feb. 27, 1868	
Benjamin Disraeli.....	Dec. 9, 1868	
Benjamin Disraeli (Earl of Beaconsfield).....	Feb. 21, 1874	
William Ewart Gladstone.....	April 28, 1880	
Marquis of Salisbury.....	June 24, 1885	
William Ewart Gladstone.....	Feb. 8, 1886	
Marquis of Salisbury.....	August 3, 1886	
William Ewart Gladstone.....	August 18, 1892	

It has become the most important function of the House of Commons in modern times to appoint the government for the time being, and, more immediately, those leading members of the government, headed by the prime minister, known as the cabinet.

SESSIONS OF PARLIAMENT.—Parliament is summoned by the writ of the sovereign issued by advice of the Privy Council, at least thirty-five days previous to its assembling. On a vacancy occurring in the House of Commons while Parliament is sitting, a writ for the election of a new member is issued upon motion in the House. If the vacancy occurs during the recess, the writ is issued at the instance of the speaker.

It has become customary, during recent years, for Parliament to meet in annual session extending from the middle of January to about the end of August. Every session must end with a prorogation, and by it all bills which have not been passed during the session fall to the ground. The royal proclamation which summons Parliament in order to proceed to business must be issued fourteen days before the time of meeting. A dissolution is the civil death of Parliament: it may occur by the will of the sovereign, or, as is most usual, during the recess, by proclamation, or finally by lapse of time, the statutory limit of the duration of the existence of any Parliament being seven years. Formerly, on the demise of the sovereign, Parliament stood dissolved by the fact thereof; but this was altered in the reign of William III. to the extent of postponing the dissolution till six months after the accession of

the new sovereign, while the Reform act of 1867 settled that the Parliament "in being at any future demise of the Crown shall not be determined by such demise."

Both Houses of legislature must be prorogued at the same time. The prorogation takes place either by the sovereign in person, or by commission from the Crown, or by proclamation. The Lower House appears at the bar, and if the sovereign be present, the speaker reports upon the labors of the session; the royal assent is then given to bills of the closing session, and a speech from the sovereign is read; whereupon the chancellor prorogues the Parliament to a certain day. Parliament resumes business, however, as soon as it is summoned by royal proclamation on a certain day, which may be at a date earlier than the original date of prorogation appointed. Should the term of prorogation elapse, and no proclamation be issued, Parliament cannot assemble of its own accord.

The following is a table of the duration of Parliaments of the United Kingdom during the present century:

Parliament.	When met.	When dissolved.	Existed.
			Y M D
1st	Sept. 27, 1796	Jan. 29, 1802	5 4 8
2nd	Aug. 31, 1802	Oct. 24, 1806	4 1 25
3rd	Dec. 15, 1806	April 29, 1807	0 4 15
4th	June 22, 1807	Sept. 24, 1812	5 3 7
5th	Nov. 24, 1812	June 10, 1818	5 6 16
6th	Aug. 4, 1818	Feb. 29, 1820	1 6 25
7th	April 25, 1820	June 2, 1826	6 1 9
8th	Nov. 14, 1826	July 24, 1830	3 10 10
9th	Oct. 26, 1830	April 23, 1831	0 5 28
10th	June 14, 1831	Dec. 3, 1832	1 5 20
11th	Jan. 29, 1833	Dec. 30, 1834	1 11 1
12th	Feb. 19, 1835	July 18, 1837	2 5 0
13th	Nov. 14, 1837	June 23, 1841	3 7 9
14th	Aug. 11, 1841	July 23, 1847	5 11 12
15th	Sept. 21, 1847	July 1, 1852	4 8 11
16th	Nov. 4, 1852	Mar. 20, 1857	4 4 11
17th	April 30, 1857	April 23, 1859	1 11 23
18th	May 31, 1859	July 6, 1865	6 1 6
19th	Feb. 6, 1866	July 31, 1868	2 5 25
20th	Dec. 10, 1868	Jan. 26, 1874	5 1 16
21st	Mar. 5, 1874	Mar. 24, 1880	5 6 17
22nd	April 29, 1880	Nov. 18, 1885	5 6 20
23rd	Jan. 13, 1886	June 26, 1886	0 5 14
24th	Aug. 5, 1886	June 28, 1892	5 10 25
25th	Aug. 4, 1892		

AREA AND POPULATION OF THE BRITISH EMPIRE BY COUNTRIES.—The following figures are from the official census returns of 1891—the latest published at the date of sending these pages to press.

Name of Country.	Area in Sq. Miles.	Population.
Great Britain and Ireland.....	121,115	38,000,000
Indian Possessions, etc.....	1,648,944	286,000,000
Other Eastern Possessions.....	104,441	4,169,000
Australasia, etc.....	3,171,978	4,200,000
America (North).....	3,572,457	5,200,000
America (South).....	115,419	285,000
Africa.....	295,000	4,000,000
West Indies, etc.....	13,750	1,136,000
European Possessions.....	131	185,500
Totals.....	9,043,225	343,275,000

There is a considerable quantity of very recently acquired territory, the exact boundaries of which as yet remain undetermined and of whose population no accurate census has yet been taken. It is estimated that this will swell the total area of the Empire to 11,190,513 square miles and its population to 364,004,000.

The area and population of the divisions of the United Kingdom in 1891 were as follows:

Subdivisions.	Area in Sq. Miles.	Population.
England	50,823	27,482,104
Wales	7,363	1,518,914
Scotland	30,417	4,003,103
Ireland	32,583	4,706,162
Isle of Man	220	55,598
Channel Islands	75	32,272
Army, Navy, and Seamen abroad .....	.....	.....
Totals	121,481	37,888,153

Of the total population, 19,319,157 were males, and 19,421,126 were females. In England and Wales the decennial increase was 11.65; in Scotland, 7.96; in Ireland, a decrease of 9.01; in the other Islands, a decrease of 4.07.

In England the density of population per square mile was 484; in Wales, 184; in Scotland, 122; in Ireland, 159.

In 1891 the emigration from the United Kingdom to British North America was 83,791; to the United States, 252,771; to Australasia, 19,714; total, 334,451.

EDUCATION AND RELIGION.—Elementary education is now compulsory in the United Kingdom, and in 1889 it was made free in Scotland. On April 1, 1891, there were in England and Wales 2,287 school boards embracing a population of 16,580,279. England and Wales reported in 1891 a total of 68 universities; Scotland, 6; Ireland, 4; total, 75; with 1,175 teachers, and 22,760 students. The total grants to primary schools in Great Britain (for examination and attendance of scholars) in 1891 was £5,351,000.

In England the Protestant Episcopal continues to be the established church, but all other churches are fully tolerated, and civil disabilities do not attach to any class of British subjects. There are 2 archbishops and 31 bishops. At the last census the population claiming membership in the State church was estimated at about 13,500,000, leaving about 12,500,000 to other creeds.

There are many Protestant dissenting religious bodies, the most numerous being Methodists of various branches, Independents or Congregationalists, Baptists and Presbyterians. The Methodists reported about 14,000 chapels with 760,000 members; the Independents, 360,000 members; the Baptists, 3,700 chapels, with 300,000 members. There are recorded in Great Britain 180 different religious denominations.

The number of Roman Catholics in England and Wales in 1887 was estimated at 1,354,000, with one archbishop and 14 bishops. In December, 1891, there were 1,362 Roman Catholic chapels and stations, with 2,573 officiating clergy.

The number of Jews in Great Britain and Ireland in 1888 was estimated at 70,000, of whom 40,000 resided in London.

The number of parishes of the established (Presbyterian) church in Scotland in 1890 was 1,332, with 1,663 chapels and stations and about 1,700 clergy. The number of Scotch Presbyterians not members of the established church is also large. The Free church in 1890 reported a total of 1,165,000. There are also Baptists, Independents, Methodists, and Unitarians. The Episcopal church in Scotland reported 7 bishops, 286 churches, 266 clergy, with an adhering population of about 80,000.

The Roman Catholic church in Ireland in 1890

was under the supervision of 4 archbishops and 23 bishops. In 1891 the census showed a total Roman Catholic population of 3,549,856.

The Church of Ireland (Protestant Episcopal) had, in 1891, 1,500 churches, with 620,000 members.

There were also in Ireland at the census of 1891, 446,687 Presbyterians, 55,235 Methodists, 17,017 Independents, 5,111 Baptists, 3,032 Quakers or Friends, and 1,798 Jews.

REVENUES AND EXPENDITURES.—The Budget for the year ending March 31, 1891, reported the estimated government income at £90,406,000 and the expenditure at £86,627,000. The sources of income and the branches of expenditure are shown in the following recapitulatory lists:

SOURCES OF INCOME, 1891.

Customs	£20,695,499
Excise	25,282,635
Stamps	15,475,824
Property taxes	16,279,125
Postal	10,747,594
Telegraphs	3,642,329
Crown lands	507,311
Suez Canal shares	279,155
Miscellaneous	3,416,663
Total income	£95,326,135

BRANCHES OF EXPENDITURES, 1891.

National debt charges	£25,000,000
Interest on railway bonds, etc.	214,000
Naval defense fund	1,430,000
Other consolidated fund charges ..	1,664,000
The army	17,728,000
The navy	13,787,000
Civil services	15,661,000
Collections and inland revenue	2,668,000
Postoffice service	5,548,000
Telegraph service	2,244,000
Packet service	653,000
Total expenditure	£86,627,000

Of the amount received from customs in 1891, the sum of £9,536,234 was for duties on tobacco; £3,418,562 for duties on tea; and £5,016,432 for duties on liquors. Of the receipts from excise the sum of £29,845,872 was for spirits, beer, and license duties, making a total government income in 1891 from spirits, liquors, and license duties of £34,862,304 or nearly £175,000,000.

The item "property taxes" embraces the following: "Land tax," £1,025,764; "house duty tax," £1,526,763; and the "income and property tax," £13,143,932; a total of property taxes of £15,696,459. As English statisticians regard the first four items of income recorded above as "taxes," the total income from taxes in the United Kingdom in the year ending March 31, 1891, must be set down at £80,456,332 or about £400,000,000. This is nearly five-sixths of the total income of the United Kingdom.

The national expenditures fall substantially under three categories: (1) The consolidated fund charges (£28,703,000), mainly applied on the national debt; (2) the army and navy (£31,685,000) and (3) the civil service, including expense of collection of revenue (£27,345,000) for year ending March 31, 1891.

The income tax is regarded as the most important of the direct taxes. This tax since 1881 has been from 5d. to 8d. per pound. In 1881 the rate was 6d.; in 1882, 5d.; in 1883, 6½d.; in 1883, 5d.; in 1885, 6d.; in 1886 and 1887, 8d.; in 1888, 7d.; in 1889 and 1890, 6d. Since 1877 only incomes of and over £150 are charged, and with an abatement of £120 on those under £400.

THE NATIONAL DEBT.—The national debt was greatest at the peace of Paris, 1815. The increase

during the war with Napoleon had been £323,386,041. At the commencement of the Crimean war in 1854, it was £769,082,549; during that war, about three years, it grew to £808,108,722, an increase of £39,026,173. On March 31, 1891, the debt was £685,954,018. The net total of the national debt, after deducting assets and balances, was at that date £680,681,581, or about \$3,402,407,905.

THE BRITISH ARMY.—During the year ending March 31, 1892, the army of the United Kingdom consisted of 7,473 commissioned officers; 993 "warrant" officers; 15,886 sergeants; 3,684 drummers, trumpeters, etc.; and 125,680 rank and file; a total of 153,696 men of all ranks—an increase of 1,213 over the previous year.

The official returns for 1891 showed a register of 13,316 officers and men in the cavalry; 21,078 in the artillery; 7,044 engineers, 86,896 infantry and spe-

cial corps; and 11,604 in miscellaneous establishments.

The maintenance of a standing army in time of peace without the consent of Parliament is forbidden by the bill of rights of the United Kingdom. Parliament must act on this question every year. There are two royal military academies or colleges—at Woolwich and Sandhurst.

The above figures include only those of the standing army. In addition there were four classes of reserves or auxiliary forces, viz.: reserves, 72,710; militia, 141,438; yeomanry, 14,086; volunteers, 262,613. These, with the standing army at home, and a force of 72,496 in India, make a grand total of 717,089 officers and men.

The daily pay of the staff and officers and also of the regimental lists is shown by the subjoined table, as furnished in the official reports of 1891:

Lieutenant-General, £5 10s.; Major-General, £3; Brigadier-General, £2 10s.; Colonel on Staff, £2 and £2 10s.; Deputy-Adjutant and Quartermaster-General, £2; Assistant ditto, £1 5s.; Deputy Assistant ditto, 21s.; Brigade-Majors, Senior Aids-de-Camp, and Assistant Military Secretaries, 21s.; Aids-de-Camp, 15s. and 18s.; Staff-Captains, 15s.; Garrison and Camp Quartermasters, 9s. to 15s.

REGIMENTAL DAILY PAY (BRITISH ESTABLISHMENT).

	R. Horse Artillery.	Royal Artillery. (Field.)	Royal Engineers.	Household Cavalry.	Line Cavalry.	Foot Guards.	Infantry.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Colonel.....		26 0	26 0			26 9	
Lieutenant-Colonel.....	24 9	18 0	18 0	23 6	21 6	23 0	13 0
Major.....	18 6	16 0	16 0	15 6	15 0	15 6	13 7
Captain.....	15 0	11 7	11 7	13 6	13 0	11 7	11 7
Lieutenant.....	8 10	6 10	6 0	9 0	7 8	6 6	6 6
Second-Lieutenant.....	7 8	5 7	5 7	6 8	6 8	5 8	5 8
Adjutant.....	17 6	14 1	2 6†	12 6	15 6	10 0	14 1
Riding-Master.....	10 6	9 6	9 6	10 6	10 6		
Quartermaster.....	10 6	9 6	9 6	10 6	10 6	9 0	9 0
Sergeant (Corporal) Major.....	6 0	5 10	6 0	5 10	5 4	5 2	5 0
Bandmaster.....	6 0	6 0	6 0	5 6	5 6	5 0	5 0
Quartermaster Sergeant (Corporal) Major.....	4 4	4 0	5 3	4 6	4 2	4 0	4 0
Sergeant (Corporal) Instructor.....	4 2	4 0		4 3	3 3	3 3	3 3
Battery Sergeant-Major, do. Q.-M. Sergt.....	4 4	4 2					
Armorer Sergeant (Corporal).....			4 6	4 6	4 6	4 6	4 6
Troop and Company Sergt. (Corporal) Major.....			4 4	3 9	4 0	3 10	
Farrier Quartermaster Sergeant (Corp.).....	4 5	4 3	4 6	4 3	4 0		
Wheeler Quartermaster Sergeant.....	3 11	3 9					
Collar-maker and Saddler Q. M. Sergt. (Corp.).....	3 11	3 9		4 0	3 8		
Orderly-room Sergeant (Corporal).....	2 8	2 8	4 6	3 0	2 8	2 6	2 6
Serg. (Corp.) Trumpeter, Sergt. Bugler.....	3 4	3 2		3 2	2 8	2 6	2 4
Serg. (Corporal) Cook.....	3 4	3 2	3 3	3 0	2 8	2 6	2 4
Sergeant (Corporal of Horse).....	3 4	3 2	3 6	3 0	2 8	2 6	2 4
Sergt. (Corp.) Farrier and Carriage Smith.....	3 9	3 7	3 8	3 4	2 10		
Paymaster-Sergeant (Corporal).....				3 0	2 8		2 6
Kettle-Drummer, Sergeant-Drummer.....				2 4		2 6	2 4
Corporal Artificer, Color-Sergeant.....			2 11		2 0	3 2	3 0
Corporal.....	2 8	2 6	2 9	2 8		1 9	1 8
Bombardier, Second-Corporal.....	2 5	2 3	2 5	2 2			
Collar-maker, Wheeler, Saddler, Artificer.....	2 5	2 3	1 11	1 11	2 4½	1 9½	
Shoeling and Carriage Smith.....	2 2	2 0		2 3	1 8		
Trumpeter, Bugler, Drummer and Fifer.....	2 0	1 2½	1 4	1 11	1 4	1 2	1 1
Gunner, Sapper, Private.....	1 4	1 2½	1 4	1 9	1 2	1 1	1 0
Driver.....	1 3	1 2½	1 4				

* Mounted.

** Dismounted.

† Additional to regimental pay.

THE BRITISH NAVY.—The navy of the United Kingdom is a perpetual establishment, and the statutes under which it is governed have been fixed with precision. We have stated above that for the army, the first vote of Parliament sanctions the number of men to be maintained; the second, the

charge for their pay and maintenance. For the navy, no vote is taken for the number of men; the first vote is for the wages of the stated number of men and boys to be maintained; and, though the result may be the same, this distinction exists both in practice and principle.

The number of seamen and marines provided for the naval service in the estimates for 1890-91, and also for the previous year, was as follows:

Branches of service.	1890-91	1891-92
For the fleet (including Indian troop-ships):		
Officers and seamen	43,449	44,734
Boys (including 1,950 under training)	6,244	7,149
Marines afloat and on shore	13,882	13,879
For the coast guard	4,200	4,200
Officers for various services	1,025	1,038
Total, all ranks	68,800	71,000

Included in the number of 44,734 seamen of the fleet were 14 flag officers and 2,690 commissioned officers, on active service. Provision was also made for 21,445 men of the royal navy reserves, 3,010 seamen and marine pensioner reserves, and 2,000 naval artillery volunteers.

The following table is taken from the official returns:

The total cost of the addition is calculated at £22,669,000. Of the armored turretted battle ships, three, the *Inflexible*, the *Trafalgar* and the *Nile*, have each a tonnage of nearly 12,000, and an armor thickness of 20 to 24 inches. The *Inflexible* is 320 feet long and 75 feet beam, with a total weight of 3,275 tons.

Class of Ships.	No. ships afloat Jan. 1, 1889.		Proposed standard in 1894.	
	Number.	Tonnage.	Number.	Tonnage.
Armored.				
Battle ships, first class	17	165,330	30	338,950
" " second class	15	97,010	17	115,010
" " others	6	55,660	6	55,660
Coast defense ships	12	37,230	12	37,230
Cruisers, first class	12	76,650	12	76,650
" " second class				
" " others				
Total armored	62	431,880	77	618,500
Protected.				
Cruisers, first class			11	84,150
" " second class	10	39,000	51	109,625
" " third class	13	66,900	24	46,880
" " others				
Torpedo depot ships			1	6,620
Torpedo ram	1	2,640	1	2,640
Total protected	29	78,540	88	309,915
Unprotected.				
Cruisers, second class	10	40,470	10	40,470
Corvettes	1	1,970	1	1,970
Sloops	17	17,870	19	20,210
Gun vessels	8	6,302	8	6,302
Torpedo cruisers	10	17,320	10	17,320
Torpedo gunboats	4	2,125	31	21,970
Gunboats	62	24,536	71	31,571
Torpedo boats, first class	80	4,178	86	4,538
" " second class	61	612	61	782
Dispatch vessels	2	3,350	2	3,350
Torpedo depot ship	1	6,400	1	6,400
Special service ships	14	9,419	14	9,419
Miscellaneous	22	34,383	22	34,382
Total unprotected	282	168,724	336	198,634
Total	273	679,144	501	1,127,049

COMMERCE AND INTERNAL COMMUNICATION.—The United Kingdom is classed as a free-trading country, the only duties levied being chicory, cocoa, coffee, dried fruits, plate, spirits, tea, tobacco and wine, the bulk of all the levies being spirits, tobacco, tea and wine. In 1889 the total imports were valued at £427,837,595; the duties levied were on goods valued at £29,671,692, or about 7 per cent. of the total imports. The total imports in 1890 were estimated at £420,691,997.

In 1889 the railway mileage aggregated 20,073 miles; on Jan. 1, 1891, there were in England and

Wales 14,119 miles; in Scotland, 3,162 miles; and in Ireland, 2,792 miles.

In April, 1891, the telegraph mileage aggregated 31,824 miles in length, with 190,312 miles of wire, including 17,211 miles of private wire.

For the history of Great Britain see *Britannica*, where it is brought down to the year 1874. The following is a reliable epitome of subsequent events:

The new Parliament of 1874, showing a large majority in support of a conservative ministry, Mr. Gladstone at once resigned and Mr. Disraeli entered

office as prime minister. During the term of power of the Conservatives, the Eastern question was again brought forward. Under the pretext of rescuing the Christians of Bosnia and Herzegovina from Mussulman oppression, Russia, with the view of acquiring Constantinople, declared war upon Turkey. Disraeli, in 1878, sent the British fleet to the Dardanelles, seized Cyprus, and ordered a contingent of Indian troops to Malta. On March 3, 1878, by the treaty of San Stefano, peace was concluded between Russia and Turkey. In the following summer the treaty of Berlin was made. The "Jingo" foreign policy of Disraeli precipitated an unrighteous war on the Zulu king, Cetawayo, and led also to the inglorious attack upon the liberties of the Boers in the Transvaal. The same spirit found expression in dealing with Indian affairs. Early in his ministry Disraeli appealed to the Oriental imagination by proclaiming Queen Victoria Kaiser-i-Hind, or Empress of India. An expensive series of campaigns in Afghanistan resulted in the replacement of a puppet ruler upon the throne of that country. At home, trade became depressed, taxes increased and in 1880 Lord Beaconsfield, as he had now become, dissolved Parliament. Mr. Gladstone then commenced his famous Midlothian campaign, and after a series of speeches which have become historical for power and eloquence, was returned to the House of Commons, backed by a Liberal majority of 150. The first care of the great Liberal was to put an end to the South African difficulty. He then turned his attention to Ireland, but, apparently, he had not at that time (1881) risen to an appreciation of the real condition of the sister island. His well-meant Land Act, which secured fixity of tenure, fair rents and free sale, was offset by its accompanying legislation, the Coercion Bill, under which more than 700 persons were imprisoned without trial in the winter of 1881-82. On May 6, 1882, the cause of Irish liberty received an almost fatal blow, when Lord Frederick Cavendish, the newly appointed chief secretary, and his subordinate, Mr. Burke, were murdered in Phoenix Park.

In 1882, the troubles in EGYPT (q. v.) led to the bombardment of Alexandria and the war of the Soudan. In 1885, the Home Rulers elected 84 of the 103 Irish members of parliament. They united with the conservatives and defeated the liberal administration, but on Mr. Gladstone's return to power a few months later he immediately introduced his great measure of Home Rule, which led to the revolt of the Liberal Unionists and their coalition with the Tories. A composite ministry was then formed, with the Marquis of Salisbury at its head, but the coalition led to a decided revolt by the great English constituencies, and at the general election of 1892, the Liberals were again returned to power. On February 13, 1893, Mr. Gladstone introduced his new Home Rule measure in the House of Commons. He spoke vigorously and clearly upon it for over three hours, creating by the masterly treatment of his subject a profound impression throughout the entire civilized world.

GREECE, kingdom of the Hellenes. Area, 25,041 sq. miles. Population (in 1890), 2,187,208. Capital, Athens, with a population of 114,335. For the geography, history and productions of Greece, see *Britannica*, Vol. XI, pp. 80-153. The territory detached from Turkey, consisting of most of Thessaly and a strip of Epirus, was added to Greece by a treaty with Turkey, executed—under pressure of the Great Powers—June 14, 1881. The kingdom, excluding these, is divided into 17 nomarchies. In 1889 the area and population were as follows:

Nomarchies.	Area English square miles.	Pop'nation 1890.	Pop. per sq. mile 1890.
NORTHERN GREECE:—			
Attica and Boeotia.....	2,472	257,764	104
Phocis and Phthiotis.....	2,044	136,470	67
Acarnania and Etolia.....	3,013	162,020	54
PELOPONNESUS:—			
Argolis and Corinth.....	1,442	144,836	100
Achaia and Elis.....	1,901	210,713	111
Arcadia.....	2,020	148,385	73
Messenia.....	1,231	183,293	150
Laconia.....	1,679	126,888	75
ISLANDS:—			
Euboea and Sporades.....	2,216	103,442	47
Cyclades.....	923	131,508	142
Corfu.....	431	114,581	266
Zanthe (Zakynthos).....	277	40,970	160
Cephalonia (Kephallonia).....	302	80,478	265
THESSALY:—			
Arta.....	396	32,890	83
Trikalla.....	2,200	143,143	65
Larissa.....	2,478	168,034	68
Total.....	25,041	2,187,208	87

KING AND ROYAL FAMILY.—Georgios I, born Dec. 24, 1845, the second son (Wilhelm) of Prince Christian of Schleswig-Holstein-Sonderburg-Glücksburg, present king of Denmark; elected king of the Hellenes by the national assembly at Athens, March 13 (30), 1863; accepted the crown through his father, the king of Denmark, acting as his guardian, June 4, 1863; declared of age by decree of the national assembly, June 27, 1863; landed in Greece in Nov. 2, 1863; married Oct. 27, 1867, to Queen Olga, born Aug. 22 (Sept. 3), 1851, the eldest daughter of Grand-duke Constantine of Russia, brother of the late Emperor Alexander II.

CHILDREN OF THE KING.—I. Prince Konstantinos, heir-apparent, born Aug. 2, 1868; married Oct. 27, 1889, to Princess Sophia, Princess of Prussia. II. Prince Georgios, born June 24, 1869. III. Princess Alexandra, born Aug. 30, 1870. IV. Prince Nicolaos, born Jan. 21, 1872. V. Princess Maria, born March 3, 1876. VI. Prince Andreas, born Feb. 13, 1882. VII. Prince Christophoros, born Aug. 10, 1888.

By decision of the Greek national assembly of May 15, 1863, a civil list of 1,125,000 drachmai (about \$200,000), was settled on King Georgios I., to which the governments of Great Britain, France and Russia added 4,000l. (or \$120,000) each, making the total income of the sovereign of Greece about 52,000l. (\$260,000) per annum. An annuity of 200,000 drachmai (about \$40,000) has been allowed to the heir-apparent since he came of age, in August, 1886.

MOVEMENT OF POPULATION.—The chief occupations of the people are the following, in percentages of the population, in Greece and Ionian Islands (census 1879): Agriculture, 40 per cent.; shepherds, 9 per cent.; industries, 6.37; servants, 7.75; laborers, 8.11; commerce, 6.37; landed proprietors, 6.10; seafaring, 3.05; army and navy, 4.86; priests, 1.50. In the ceded provinces (1881): Agriculture, 41.95; laborers, 12.32; industries, 10.21; shepherds, 8.18; servants, 7.24; commerce, 6.47; priests, 1.61.

The nationality of Greece is Hellenic. Most of the Albanians who have, at various dates during the last 400 years, migrated into Greece, have become Hellenized. At present there are not more than 90,000 or 100,000 of distinct Albanian nationality in the whole of Greece. These are scattered

in small communities, chiefly over Attica; northwards, as far as Thebes; then across the Isthmus of Corinth, throughout the ancient Argolis, in the southern districts of Eubœa, and a few of the neighboring isles. On the other hand, there are large numbers of Greeks in the Ottoman empire, raising the whole Greek nationality to over 8,000,000, as follows: Greece, about 2,200,000; Asia Minor, 2,000,000; Crete, Cyprus and other Ottoman islands, 400,000; European Turkey, 3,500,000; total, 8,100,000.

About one-half of the total population of Greece is agricultural, living dispersed in villages. The principal towns are the following:

Athens (1889).....	114,355	Argos.....	9,861
Piræus.....	34,569	Pyrgos.....	8,788
Patras.....	38,000	Argostoli.....	7,871
Hermoupolis.....	27,000	Calamata.....	11,000
Corfu.....	27,000	Chalcis.....	6,877
Zante.....	16,280	Spetsai.....	6,495
Larissa.....	13,169	Hydra.....	6,446
Tripolis.....	12,517	Mesolounghi.....	6,324

PRESENT RELIGION AND EDUCATION.—The great majority of the inhabitants of the kingdom are adherents of the Greek Orthodox church. Before the census of 1889 there were 1,902,800 belonging to the Greek Orthodox church; 14,677 other Christians, mainly Roman Catholics; 5,792 Jews; and 24,165 Mohammedans. By the terms of the constitution of 1864, the Greek Orthodox church is declared the religion of the state, but complete toleration and liberty of worship are guaranteed to all other sects. Nominally, the Greek clergy owe allegiance to the patriarch of Constantinople, though he now exercises no governing authority. The Orthodox church has nine archbishops and eight bishops in Northern Greece; six archbishops and six bishops in the Peloponnesus; one archbishop and five bishops in the islands of the Greek Archipelago; and five archbishops and ten bishops in the Ionian Islands. There are 161 monasteries and nunneries, with 2,620 monks and 485 nuns.

All children between the ages of five and twelve years must attend school, but the law is not well enforced in country districts. According to the census of 1879, 86.06 per cent. of males and 23.08 females could read and write. The following are the educational statistics of Greece for 1884: Universities, 1; gymnasia, 33; Hellenic schools, 297; communal schools, 1,741; elementary, 540; private, 81; ecclesiastical, 5; polytechnic, 1; pupils, 144,098.

The budget under date of Jan. 1, 1891, being the latest official report, contained an appropriation of 3,000,000 drachmai by the government for higher and middle education.

REVENUE AND EXPENDITURE.—The budget for 1892 estimates the total revenue at 96,541,462 drachmai, and the expenditures at 100,411,479 drachmai. The total amount of Greek indebtedness in June, 1892, was 704,892,500 drachmai. Of this sum rather less than 9,000,000 drachmai are for small outstanding internal indebtedness. In all accounts since 1882, the drachma is reckoned as equal to one franc.

ARMY AND NAVY.—All able-bodied males 21 years old are liable to military service, the total period of service being 19 years, of which two years must be passed with the colors, 7 and 8 years in the reserve, and the remainder in the militia or landwehr.

The nominal strength of the army in 1891 was 1,987 officers; 5,873 non-commissioned officers; 20,364 rank and file; total, 28,224, a larger number than that of the army of the United States of America.

The navy at the opening of 1890 consisted of two small armor-clads (1,710 tons), carrying two 10-ton

Krupp guns in a battery on the upper deck and four 20-pounders, speed 12 knots; and a wood-built vessel, the *Basalissa Olga* (2,060 tons), carrying four 6-ton and two 5-ton guns, speed 10 knots. One steel armor-clad, the *Hydra*, was launched in 1889; it is 6,000 tons, and is now in commission; another similar vessel has been constructed in France. There are 28 small torpedo boats and launches, and two Nordenfeldt submarine torpedo boats. Of unprotected vessels, there are two corvettes (1,300 and 1,800 tons), two cruisers (1,000 tons each, launched 1884-'85); 12 gun-vessels (six built 1881-'84, the rest old); four gunboats (1880); three revenue vessels (1884), an old steel yacht, an iron transport, and 17 miscellaneous craft. The budget for 1889 fixes the strength of the navy at 2,945 officers and men, but the actual number for 1891 was 3,957. The navy is manned partly by conscription from the people of the sea-coast and partly by enlistment. In 1887 the period of service was made two years instead of one.

INTERNAL COMMUNICATION.—Recently the internal communication by roads has greatly improved; there are now (1893) about 2,000 miles of roads. In May, 1882, the construction of a canal across the Isthmus of Corinth, about four miles, was begun; it is estimated to cost a million sterling; and more than three-quarters of the work is now completed.

Railways were opened in 1893 for a length of 374 miles, while 420 miles were under construction, and 226 miles were projected.

The telegraphic lines, land and submarine, were of a total length of 4,658 English miles, at the end of 1892; length of wire, 5,082 miles. The number of officers was 178. They despatched 686,416 inland telegrams, and 276,045 international, in the year, 1888. Receipts (1888), 1,130,160 drachmai; expenses, 992,320 drachmai.

Of post offices there existed 248 at the end of 1889, and there passed through the post in that year 7,664,000 letters, besides 236,000 post-cards, 6,779,000 samples, journals and printed matter. The receipts were 2,603,614 drachmai; expense, 2,882,240 drachmai. The total number of letters, post-cards, samples, newspapers, etc., which passed through the post office in 1890 was 14,319,864, of which 8,961,319 were internal and 5,358,545 international.

GREELY, the county-seat of Weld county, Colorado. It is a considerable trade center, and is situated advantageously at the junction of the Platte and Cache la Poudre rivers about midway between Cheyenne and Denver. Its educational institutions are of a high order of merit and have gained for it some reputation. Pop., 2,395.

GREELY, ADOLPHUS WASHINGTON, Arctic explorer, born in Newburyport, Mass., March 27, 1844, and graduated at Brown High School in 1860. He served as a volunteer through the war of 1861-'65; shortly after its conclusion entered the Regular Army as lieutenant, and in 1868 was placed on the Signal Service. In 1881 he was selected to conduct the expedition sent into the Arctic regions for the purpose of carrying on observations in accordance with the international plan arranged at Hamburg in 1879. With a party of twenty-five he sailed from St. John's, Newfoundland, in the *Proteus*, July 7, 1881. He and the six survivors of his party were rescued June 22, 1884, when at the point of perishing from starvation. Two of the party, Lieutenant Lockwood and Sergeant Brainerd, traveled to within 396 miles of the geographical pole, the most northern point hitherto reached. In 1887 Greely was appointed chief of the Signal Service, with rank of brigadier-general. In 1886 he published *Three Years of Arctic Service*.

GREEN, ANNA KATHERINE, novelist, daughter of James Wilson Green, a lawyer, who has held public positions in New York and elsewhere, was born at Brooklyn, N. Y., and educated at Ripley College, Poughkeepsie, N. Y. She has published *The Sword of Damocles*, 1881; *The Defense of the Bride*, and other poems, 1882; *The Mill Mystery*, 1886; *Marked Personal*, 1893. She became Mrs. Charles Rohlfis in 1884.

GREEN, MARY ANNE EVERETT, *née* Wood, was born in 1818, at Sheffield, England. In 1841 she removed with her parents to London. She edited *Letters of Royal and Illustrious Ladies* (1846); *The Diary of John Rous* (Camden Soc. 1856); *Letters of Queen Henrietta Maria* (1857). By appointment of the Master of the Rolls she calendared the papers of the reigns of James I. and Charles II.

GREEN, HORACE, M. D., LL. D., born at Chittenden, Vt., Dec. 24, 1802, died in Sing Sing, N. Y., Nov. 29, 1866. He graduated at the University of Pennsylvania, and at Middlebury College; began practice in Rutland, and afterwards spent several years abroad, studying in the hospitals of Edinburgh, London and Paris. On his return he became professor in the Medical College of Castleton, Vt., and remained there until his removal to New York city in 1850. He was soon afterwards chosen professor of the theory and practice of medicine in the New York Medical College, which position he held until obliged by failing health to resign in 1860. Author of *A Treatise on Diseases of the Air-Passages* (1846); *Pathology and Treatment of Croup* (1849); *Report of A Hundred Cases of Pulmonary Diseases* (1858), and other works.

GREEN, JACOB, son of Ashbel, born in Philadelphia, July 26, 1790, died there Feb. 1, 1841. He graduated at the University of Pennsylvania in 1806; in 1818 became professor of chemistry, experimental philosophy, and natural history at Princeton, and in 1822 professor of chemistry at Jefferson Medical College, which position he held until his death. Author of *Chemical Diagrams*; *Chemical Philosophy* (1829); *Astronomical Recreations* (1829); *A Syllabus of a Course of Chemistry* (1835); *Trilobites* (2 vols., 1832); *The Botany of the United States* (1833); *Notes of a Traveler* (1831); and *Diseases of the Skin* (1841).

GREEN, JOHN RICHARD, an English historian, born at Oxford in 1837, died at Mentone, Italy, March 7, 1883. After being educated at Magdalen College School and Jesus College, he took orders in 1860, and became curate of St. Barnabas church, a poor parish in the east of London. In 1862 he had charge of Hoxton, and in 1865 was made vicar of St. Philip's, Stepney. Overwork during the cholera time in 1868 obliged him to retire, and Archbishop Tait made him librarian at Lambeth. His health remained delicate, and his winters were spent usually on the Continent. He had been a frequent contributor to the "Saturday Review" before, and now he began to work on his *Short History of the English People*, which book he had ready for publication in 1874. This work was received with great enthusiasm all over England. The University of Edinburgh conferred on the author the degree of LL. D. In 1877 Green gathered a number of his essays into a book under the title *Stray Studies*, and in 1882 published a masterly work on *The Making of England*, wherein he went deeply into the foundation of England's greatness. In continuation of this he was preparing another work, to be called *The Conquest of England*, when his labors were cut short by death. In all his writings Green showed a lively imaginative faculty. His characters live, move, and act on each other as in real life. Distant places and times are made to appear distinct and perfectly natural.

GREEN, SAMUEL ABBOTT, physician, born at Groton, Mass., March 16, 1830, graduated at Harvard College in 1851, and took his medical degree in 1854. After spending several years in Europe he returned and settled in Boston. At the commencement of the civil war he was commissioned assistant surgeon of the 1st Massachusetts regiment of volunteers; was surgeon of the 24th Massachusetts regiment 1861-64, and for his services in the field during the latter year was brevetted lieutenant-colonel of volunteers. He was city physician of Boston in 1871-80, and was elected mayor in 1882. Author of *A History of Medicine in Massachusetts*; *Groton During the Indian Wars* (1883); *Groton Historical Series* (20 numbers, 1883-87); and other works. He has also published a large number of papers on scientific and historical subjects.

GREEN, SETH, American pisciculturist, born in Rochester, N. Y., March 19, 1817, died there Aug. 20, 1888. He received a common-school education, and for some years was proprietor of a fish and game market near his home. Having a passion for hunting and fishing, and being a close observer, he became interested in the habits of fish, and from his personal observations conceived the idea of artificial propagation. From that time he turned his attention to methods of increasing and protecting the yield of fish as a business. In 1868 he was appointed one of the fish commissioners of New York, and was soon afterwards made superintendent of fisheries in that State. He was the inventor of important hatching appliances, and the great advancement made in pisciculture is largely due to his efforts.

GREEN, WILLIAM HENRY, D. D., LL. D., born at Groveville, Burlington county, N. J., Jan. 27, 1825, graduated at Lafayette College in 1840, and studied theology at Princeton. Ordained to the Presbyterian ministry in 1848, he became pastor of the Central Presbyterian church of Philadelphia in 1849, and since 1851 has held the professorship of Hebrew and Old Testament literature in Princeton Seminary. He was chairman of the Old Testament company of the American committee of revision. He declined the presidency of Princeton in 1868. Author of *Hebrew Grammar* (1861); *Hebrew Chrestomathy* (1863); *The Pentateuch Vindicated from the Aspersions of Colenso* (1863); *The Argument of the Book of Job Unfolded* (1874).

GREENBACK PARTY, a political party which for some years after the war advocated the issue of paper currency by the government, and that national banks should be abolished. It has nominated presidential candidates, on two or three occasions, without success.

GREEN BAY, a city and county-seat of Brown county, Wis., situated at the head of Green Bay, and on the right bank of Fox River, at its mouth, 65 miles north-northeast of Fond du Lac and 113 miles north of Milwaukee. It is on three railroads, and has a good harbor and great facilities for trade and navigation. Large quantities of lumber are procured in Brown county, and exported from Green Bay. This city has extensive iron-works, and also several saw mills and factories. Population in 1860, 2,275; 1870, 4,666; 1880, 7,464; 1890, 9,069.

GREEN BRIER MOUNTAINS, a ridge in West Virginia lying northwest of the main Alleghenies. They are about 2,000 feet in height.

GREENBRIER RIVER, a river of West Virginia. It rises in the Allegheny Mountains in the northeastern part of the State, and flows southwest, entering the Great Kanawha River in Summers county, near Hinton. It is about 175 miles in length.

GREENCASTLE, a city, railroad center, and county-seat of Putnam county, Ind. Block coal, timber, sandstone, limestone, and some iron ore are

found in the vicinity. There are excellent schools, and De Pauw University is located here. Among the manufactures are iron and nails.

GREENCASTLE, a post-borough of Franklin county, Pa., 63 miles south of Harrisburg. It has agricultural machine works, a woolen mill, and a high school. Pop. (1890), 1,525.

GREENE COVE SPRINGS, the county-seat of Clay county, Fla., on St. John River, 30 miles south of Jacksonville. It is thought to be the "Fountain of Youth" referred to in Spanish and Indian legends. It contains a large sulphur spring.

GREENE, a village of Butler county, Iowa, on the Burlington, Cedar Rapids and Northern Railroad, 35 miles northwest of Cedar Falls. It has a good graded school, and several churches and grain warehouses. Pop. (1890), 845.

GREEN EARTH, a mineral of a green color and earthy character, often found in the vesicular cavities of crystalline igneous rocks, sometimes also disseminated through highly decomposed basic eruptive rocks. It consists principally of silica, alumina, magnesia, and protoxide of iron. *Glauconite* is the name given to the green earth which is not infrequently met with in sedimentary rocks. In such rocks glauconite occurs in the form of grains, which in many cases are the casts of minute shells. There is also a green earth used as a pigment by painters in water-colors, who know it by the name of *Mountain Green*. For their use it is mostly brought from Monte Bolso, and from Cyprus.

GREENE, GEORGE WASHINGTON, author, was a grandson of Gen. Nathaniel Greene, and was born in Kent county, R. I., in 1811. He wrote lives of his grandfather and other biographical and historical works, and from 1837 to 1845 was United States consul at Rome. He died Feb. 2, 1883.

GREENE, SAMUEL STILLMAN, born in Massachusetts, May 3, 1810; was for many years connected with educational matters in that State and in Rhode Island. In 1855 he became professor of mathematics and civil engineering in Brown University, and in 1864 was made professor of astronomy there, retaining the last position until his death in 1884.

GREENE, SAMUEL D., born in Cumberland, Md., 1839; graduated at Annapolis, and in 1861 volunteered on the iron-clad *Monitor*. He had charge of the guns during her fight with the *Merrimack*, and commanded her after Lieutenant Worden had been disabled. In 1862, he served on blockade duty, and in 1872 became commander. He also held various appointments in the naval academy, and died Dec. 11, 1884.

GREENE, THEODORE P., born in Montreal, Canada, November 1, 1809; removed to Vermont, and entered the United States navy as midshipman in 1826. He became commander in 1855 and did considerable service with the gulf squadrons during the war. In 1867 he was made commodore and had charge of the Pensacola navy yard until 1871. In March, 1872, he became rear-admiral on the retired list and he died Aug. 30, 1887.

GREENEVILLE, the county-seat of Greene county, Tenn., 75 miles northeast of Knoxville. It was the home of President Andrew Johnson. Greenville and Tusculum College is near the village. P., 1,779.

GREENFIELD, the county seat of Hancock county, Ill., 21 miles east of Indianapolis. It contains an expensive school building, and manufactures of flour and furniture. Pop. (1890), 1,131.

GREENFIELD, the capital of Hancock county, Ind., situated on the Columbus, Chicago and Indiana Central Railroad, 21 miles east of Indianapolis. It has large flouring-mills, planing-mills, a furniture factory, and graded school. Pop. (1890), 3,100.

GREENFIELD, the capital of Adair county, Iowa, situated on a railroad about 20 miles from Creston. Pop. (1890), 1,048.

GREENFIELD, the county-seat of Franklin county, Mass., located in the valley of the Connecticut. It is an important market for cattle, sheep, and butter, and has manufactories of children's carriages, bolt-cutting machines, and planes. A soldiers' monument is here and also a young ladies' seminary. Pop. (1890), 5,252.

GREENFIELD, a railroad junction of Highland county, Ohio, situated in the southwestern part of the State, and on a branch of the Scioto River.

GREEN ISLAND, a railroad junction of Albany county, N. Y., is an island lying in the Hudson River between Troy and West Troy, with which places it is connected by bridges. Machinery, castings, iron, and many railroad cars are here manufactured. Pop. (1890), 4,463.

GREENLEAF, HALBERT S., of Rochester, N. Y., a manufacturer, born in Guilford, Vt., April 12, 1827. He received a common school and academic education, was a justice of the peace in 1856, and served as private and officer in the Union army during the civil war. In politics he is a Democrat, and was elected a representative from the thirtieth Congressional district of New York to the 48th Congress. In 1890 he was elected from the same district to the 52d Congress.

GREEN MOUNTAINS, a range of the Appalachian system of mountains, extending through Vermont from Canada to Massachusetts. The highest point, Mount Mansfield, has an altitude of 4,430 feet. Other summits are Killington Peak, 4,221 feet, and the Camel's Hump, 4,188 feet in height. The mountains are mostly covered with forests of pine, hemlock, fir, spruce, and other trees, and contain iron, marble, copper, and some gold. Parts of the southern extension of this range, known as Hoosac or as Taconic Mountains, traverse the western part of Massachusetts and enter Connecticut and New York.

GREENOUGH, RICHARD SALTONSTALL, brother of Horatio, born in Jamaica Plains, Mass., April 27, 1819, and educated at the Boston Latin School. He began his career as sculptor in Paris, returned to the United States and resided for several years in Newport, R. I., but since 1874 has spent most of his time in Europe. He has been particularly successful as a sculptor of portrait busts. Among his works are a bronze statue of Franklin, executed in 1853, and placed in the City-hall Square of Boston; a marble statue of Gov. Winthrop, finished in Florence, 1855-56; the *Boy and the Eagle*, owned by the Boston Athenaeum; a *Carthaginian Woman*; *Elaine*; *Circe*; and a bust of Shakespeare, from the Chandos portrait.

GREENPORT, a village of Suffolk county, N. Y., the eastern terminus of the Long Island Railroad, 95 miles from Brooklyn. It has ship-yards, and the people are chiefly employed in fishing and coasting. On account of its bathing and fishing facilities it is a favorite resort. Pop., 2,500.

GREEN RIVER, a river of Kentucky, which rises near the center of the State, pursues a tortuous northwesterly course, and enters the Ohio River about 6 miles above Evansville, Ind. It passes near the mouth of the Mammoth Cave, and traverses the western coal-field of Kentucky. Its length is estimated at 350 miles, and it is navigable at high water 200 miles by means of locks and dams.

GREEN RIVER, a branch of the Colorado. It rises in Western Wyoming and pursues a generally southward course into Utah, uniting with Grand River near lat. 38° 16' N., and long. 110° W. Its

entire length is estimated at 750 miles, but it is not of much importance for navigation. Winding through the Great American Desert, bordered by cliffs two or three hundred feet in height, the depth of its cañons gradually increases, and for scores of miles it runs more than 7,000 feet beneath the surface.

GREENS, the common name of all varieties of kale or cabbage (*Brassica oleracea*), which do not boil, and of which the leaves are used for the table as boiled vegetables. Young unboiled cabbages, and shoots from the stocks of cabbages, are often also called greens. The leaves of German greens are very much curled. This herb is either sown in spring and planted out soon after, or it is sown in autumn and planted out in the spring.

GREENSAND, a term applied to a variety of sandstone containing considerable glauconite, a silicate of iron and potash, which imparts to it a greenish color. The greensand of Europe is divided into the Upper Greensand, belonging to the Upper Cretaceous, and the Lower Greensand, belonging to the Lower Cretaceous period (see Britannica, Vol. X, pp. 357-59). It is an important formation in the United States, and is in some localities extensively mined for fertilizing purposes. It is often called *marl*.

GREENSBORO, the county-seat of Hale county, Ala., located near the cane-brake region, which before the civil war was noted for its productiveness. Southern University, under Southern M. E. church control, is located here. Pop. (1890), 1,759.

GREENSBORO, the capital of Greene county, Ga., situated on the Georgia Railroad, 87 miles from Augusta. It contains a court-house, several churches and two academies. Pop. (1890), 1,313.

GREENSBORO, a city and county-seat of Guilford county, N. C., located 82 miles northwest of Raleigh. It contains spoke and handle manufacturing, saw and planing mills, and agricultural machine works. Much fruit is raised in the vicinity, and considerable of it is dried and shipped further south. A Methodist female college is located here. Pop. (1890), 3,317.

GREENSBURG, a city and county-seat of Decatur county, Ind., situated 47 miles southeast of Indianapolis. There are quarries here where fine stone is obtained and shipped. Among the manufactures are flour, woolen goods, furniture and carriages. The city has a pork-packing establishment and a foundry. Pop. (1890), 3,596.

GREENSBURG, the county-seat of Westmoreland county, Pa., 31 miles east of Pittsburgh. Grain, wool, coke and farming products are shipped from this point. Pop. (1890), 4,202.

GREEN SNAKE, a name applied to two different kinds of harmless grass-snakes of the United States, *Cyclophis vernalis*, common in the Middle and Northern States, and *Cyclophis aestivus*, which inhabits the Middle and Southern States. They are slender in form, and of a bright-green color.

GREEN'S POND, a town situated on an island of the same name, north of the entrance to Bonavista Bay, Newfoundland. It is a port of entry, and has importance as a fishing and sealing station.

GREENUP, the capital of Greenup county Ky., situated on the Eastern Kentucky Railroad, and on the Ohio River, about 20 miles from Portsmouth, Ohio. There are several iron furnaces near the village, and coal is mined in the vicinity. Pop., 669.

GREENVILLE, a city and county-seat of Butler county, Ala., 45 miles south of Montgomery. It has two colleges, a shingle factory, a boot and shoe factory, and other mills. Cotton and timber furnish the chief industries. Pop. (1890), 2,806.

GREENVILLE, the capital of Muhlenburg county, Ky., situated on the Paducah and Elizabethtown Railroad, 92 miles from Paducah. It has a female college, and several tobacco factories.

GREENVILLE, a city and county-seat of Bond county, Ill., 50 miles northeast of St. Louis, Mo. Almira Female College is located here. Pop., 1,868.

GREENVILLE, a city of Montcalm county, Mich., on Flat River, which has two dams at this point, and thus furnishes the abundant water-power utilized in the flour, saw, planing and shingle mills, and the machine shops and woolen mill. Pop., 3,066.

GREENVILLE, the capital of Washington county, Miss., situated on the Mississippi River, 100 miles from Jackson. It is the western terminus of the Greenville, Columbus and Birmingham Railroad. Considerable cotton is shipped here. Pop. 6,653.

GREENVILLE, a post-borough of Mercer county, Pa., on the Shenango River, at the head of the Shenango Valley. It has abundant water-power, a rolling-mill and coal works. Thiel College, under Evangelical Lutheran control, is located here.

GREENVILLE, the county-seat of Darke county, Ohio, on Greenville Creek. It has planing-mills and a furniture factory. In 1793 a fort was built here by Gen. Wayne, and two years later a treaty was here made with over 1,100 Indians. Pop., 5,473.

GREENVILLE, a city and county-seat of Greenville county, S. C. It is a pleasant summer resort, a railroad center and a great manufacturing city, carriages, wagons and cotton being among its productions. The United States court meets here semi-annually. The city is the seat of Furman University and Greenville Female College.

GREENWEED, a name given to certain half-shrubby species of *genista*. Hairy greenweed (*G. pilosa*) is sometimes grown in France on light soils as fodder for sheep.

GREENWICH, a village of Fairfield county, Conn., in the southwestern corner of the State and on Long Island Sound. The famous ride of Gen. Putnam in 1779 took place in this township.

GREENWICH, a village of Washington county, N. Y., situated on a railroad and on the Battenkill River, about 16 miles east of Saratoga Springs, and 30 miles northeast of Troy. It contains several factories. Pop. (1890), 1,663.

GREENWOOD, a village of Jackson county, Mo., on the Missouri Pacific Railroad. Lincoln College (United Presbyterian) is located here.

GREER, JAMES AUGUSTIN, born in Cincinnati, Ohio, 1833; entered the United States navy in 1848; commanded the *Benton* and a division at Vicksburg, and was with the Red River expedition. In 1873 he participated in the *Polaris* search expedition, having command of the *Tigress*. He became captain in 1876 and commodore ten years later.

GREGG, ALEXANDER P., born in South Carolina, October 8, 1819; entered the Protestant Episcopal ministry in 1846, and became rector in the same year. In 1859 he was elected bishop of Texas.

GREGG, ANDREW, born in Carlisle, Penn., June 10, 1755; became a member of Congress in 1791, and served as such until 1807, from which year until 1813 he was one of the United States senators from Pennsylvania. In 1816 he was appointed secretary of State of his native State; and he died in 1835.

GREGG, DAVID McMURTRIE an American general, born at Huntingdon, Pa., in 1833. After graduating at West Point in 1855, he served against the Indians in Oregon from 1858 to 1860 as lieutenant. At the outbreak of the civil war he was made captain in the Sixth cavalry regiment, and in January, 1862, he was appointed colonel of the Eighth Pennsylvania cavalry. He served with distinction in the Virginia peninsular campaign, and was made

brigadier-general of volunteers in 1862. From this time on he commanded a division of cavalry, and was engaged at Gettysburg and other important battles. After the Richmond campaign, in which he was engaged with the Second cavalry division, he resigned on Feb. 3, 1865. In 1874 he was sent as United States consul to Prague, Bohemia. In 1866, he became commander of the Pennsylvania order of the Loyal Legion.

GREGG, JOHN IRVIN, born in Bellefonte, Pa., July 19, 1826, served through the Mexican war, becoming first-lieutenant of the 11th infantry in February, 1847, and captain in the following September. At the commencement of the civil war he was chosen colonel of the 5th Pennsylvania volunteers, and in May, 1861, was made captain of the 6th United States cavalry. Appointed colonel of the 16th Pennsylvania cavalry in October, 1862, he commanded a cavalry brigade in the Army of the Potomac from 1863 till 1865. He resigned from the army in 1865, and was brevetted major-general of volunteers, and brigadier-general of the United States Army for distinguished services during the war. Retired in 1879.

GREGORI, LUIGI, artist, was born in Bologna, Italy, July 8, 1819; studied in Rome and at the academy of his native city, and for several years was engaged in the restoration of old paintings in the Vatican galleries. In 1874 he came to the United States and was engaged on the Capitol at Washington, D. C., and in the decoration of a church at St. Louis, after which he became director of the art museum of the University of Notre Dame, Indiana. He remained here for fifteen years, during which he produced many fine works, including the series of Columbian paintings that adorn the main hall of the University. In 1891 he returned to Italy.

GREGOROVIVS, FERDINAND, a distinguished German historian, born in East Prussia in 1821. He studied theology, but soon devoted himself to poetry and literature. In 1852 he went to Rome, where he subsequently spent most of his time. His great work is the *History of the City of Rome in the Middle Ages* (8 vols., 1859-72; 3d ed., 1875). He has written also an Italian geography and a history of Corsica (1854), Capri, and Corfu; on the graves of the Popes (1857; 2d ed. 1881); on Lucrezia Borgia (1874); on Urban VIII (1879); on Athens (1881); and on the Byzantine Empress Athenias (1882); also a tragedy on the death of Tiberius (1881); and an epic, *Euphorion* (4th ed., 1880).

GREGORY, DANIEL SEELEY, educator, born in Carmel, Putnam county, N. Y., Aug. 21, 1832. He graduated at Princeton in 1857, studied theology, and after holding various pastorates became in 1871 professor of metaphysics and logic in Wooster University, Ohio, being transferred four years later to the chair of mental science and English literature. In 1879 he became president of Lake Forest University, Ill. Author of *Christian Ethics* (1875); *Why Four Gospels?* (1876); and *Practical Logic* (1881).

GRELLET, STEPHEN, born of wealthy parents in Limoges, France, Nov. 2, 1773, died in Burlington, N. J., Nov. 16, 1855. He was educated at the military college of Lyons, and at the age of 17 entered the body-guard of Louis XVI. During the Revolution he was taken prisoner and sentenced to be shot, but made his escape to Demerara, and in 1795 came to New York. Formerly a Roman Catholic, he now joined the Society of Friends, and removing to Philadelphia ministered to the sick during the prevalence of yellow fever in 1793. He returned to New York in the following year, and was for a short time engaged in mercantile

pursuits, but soon after devoted himself entirely to missionary work. He made a tour through the Southern and New England States and Canada, and in 1807 went to Europe, where he traveled extensively.

GRENADA, a city and county-seat of Grenada county, Miss. It is a business center and has flour, lumber, planing and rolling mills. Pop. (1890), 2,416.

GRESHAM, WALTER Q., born in Harrison county, Ind., March 17, 1832; was admitted to the bar in 1853. He was elected to the State Legislature in 1860, but resigned to accept a commission in an Indiana regiment. Colonel Gresham was severely wounded at Atlanta and received the brevet of major-general of volunteers for his gallantry. In 1869 he was appointed United States judge for the district of Indiana by President Grant, and in 1880 he was prominently mentioned for United States senator. In April, 1882, he resigned from the bench to become postmaster-general under President Arthur, and on the death of Secretary Folger, in July, 1884, he became secretary of the treasury. In October, 1884, he was appointed United States judge for the seventh circuit, which office he filled with dignity until 1893. On the accession of President Cleveland, March, 1893, Judge Gresham was appointed Secretary of State.

GRETNA GREEN, a village of Dumfriesshire, near the head of the Solway Firth. After the abolition of Fleet marriages, English persons wishing to marry clandestinely had to get out of England, to which alone that act had reference. Thus the practice arose of crossing the border into Scotland, where Gretna Green had by 1771 become "the resort of all amorous couples whose union the prudence of parents or guardians prohibits." The "priest" might be anyone—blacksmith, ferryman, toll-keeper, or landlord—and "church" was commonly the toll-house, where nearly 200 couples were sometimes united in a twelvemonth.

GRÉVY, JULES, ex-president of the French Republic, born in 1807 at Mont-sous-Vaudrez. A prominent jurist, he became a prominent member of the constituent assembly, and opposed the policy of Louis Napoleon as president. From 1871 to 1873 he was president of the national assembly, and from 1876 to 1879 president of the chamber of deputies, in the latter year succeeding Marshal MacMahon as president of the Republic. At the close of the seven-years term of office he was re-elected, and two years later resigned, Dec. 2, 1887. The unexpected fall of Monsieur Grévy was indirectly due to the Limousin or "decoration" scandals. He died September 9, 1891.

GREWIA, a genus of East Indian tiliaceae trees, yielding good bast for rope making, etc. Some yield timber, and the leaves of others are used as fodder.

GREYLOCK, the chief eminence of Saddle Mountain, Berkshire county, Mass. It rises to a height of 3,600 feet, and is the highest point of land in the State. The sides of the mountain are covered with forests.

GRIERSON, BENJAMIN HENRY, born at Pittsburgh, Pa., July 8, 1826; at an early age removed to Ohio, and was afterwards engaged in business at Jacksonville, Ill. At the beginning of the civil war he served on the staff of Gen. Prentiss; in August, 1861, was made major of the 6th Illinois cavalry, and became colonel in the following spring; brigadier-general of volunteers in June, 1863, he became major-general in May, 1865, colonel of the 10th U. S. cavalry in July, 1866, and in March, 1867, was brevetted brigadier and major-general U. S. Army. He commanded the district of the Indian Territory, 1868-73; from 1875 to 1881 was engaged in ex-

ploring parts of New Mexico and Texas, and in campaigns against hostile Indians, and in 1886 was placed in command of the District of New Mexico.

GRIFFIN, a city and county-seat of Spalding county, Ga., 40 miles south of Atlanta. Cotton furnishes the chief industry, and there are factories for the making of furniture and carriages. There is a mineral spring here and the place is a summer resort. The population in 1890 was 4,503.

GRIFFIN, CHARLES, born in Licking county, Ohio, in 1826, died in Galveston, Texas, Sept. 15, 1867. He graduated at the United States Military Academy in 1847, entered the army as brevet second-lieutenant of artillery and served during the Mexican war. In June, 1849, he was promoted first-lieutenant, served on frontier duty, and was instructor of artillery at West Point in 1859-61. In the civil war he commanded the West Point battery at Bull Run, and was brevetted major for gallant conduct; in June, 1862, was commissioned brigadier-general of volunteers, and commanded a brigade in the Virginia peninsula campaign, winning distinction at Yorktown, Gaines's Mill, and Malvern Hill. He was present at the second battle of Bull Run; was promoted to the command of a division and engaged in the battles of Antietam and Fredericksburg, and the various battles of the final campaign. As commander of the 5th corps, under Gen. Grant, he was one of the commissioners to carry out the terms of the surrender of Gen. Lee at Appomattox Court-house. In May, 1865, Gen. Griffin was brevetted brigadier and major-general in the Regular Army, was assigned to the command of the district of Maine in the August following; in July, 1866, was made colonel of the 35th infantry, and commanded military districts in Texas and Louisiana.

GRIFFIN, EDWARD DORR, D.D., born in East Haddam, Conn., Jan. 6, 1770, died in Newark, N. J., Nov. 8, 1837. He graduated at Yale in 1790, studied theology, and in 1795 became pastor of the Congregational church at New Hartford, afterwards holding pastorates at Newark, N. J., and Boston, Mass. He was professor of rhetoric in Andover Theological Seminary from 1809 to 1811, and president of Williams College from 1821 to 1836.

GRIFFIN, SIMON GOODSELL, born in New Hampshire, August 9, 1824, practiced law in Concord until 1860, and entered the volunteer service at the beginning of the civil war. He was at both battles of Bull Run, at Chantilly, Antietam, and Fredericksburg, and after the latter (May, 1863) was given a brigade, with which he operated against Vicksburg. In 1864 he commanded a brigade in the Wilderness, and on June 16th stormed the Confederate lines at Petersburg and captured 1,000 prisoners. He was mustered out as brevet major-general, and in 1866-68 served in the New Hampshire Legislature, being speaker of the lower House for two terms.

GRIFFIS, WILLIAM ELLIOT, DD., an American author, born in Philadelphia, Pa., Sept. 17, 1843; graduated at Rutgers in 1869, and the following year went to Japan. He was superintendent of education in the province of Echizen in 1871, and held the chair of physics in the Imperial University of Tokio in 1872-74. On his return to this country Mr. Griffis studied theology at New Brunswick, N. J., and at Union Theological Seminary, New York city, graduating from the latter in 1877. He was pastor of the First Reformed church in Schenectady, N. Y., from 1877 till 1886, and in the latter year took charge of the Shawmut Congregational church, Boston, Mass.

GRIFFITHS, JOHN WILLIS, naval architect, born in New York city, Oct. 6, 1809, died in Brooklyn, N. Y., April 29, 1882. Early apprenticed to a ship-

wright, at 19 years of age he laid the lines of the frigate *Macedonia*. He suggested the clipper model of the fast ships built for the China trade; in 1853 he began the construction of a steamer which when completed made the fastest time on record between Havana and New Orleans. In 1858 he was appointed by the Government special naval constructor to build the gunboat *Pawnee*, and in 1872 built the United States ship *Enterprise*. Mr. Griffiths was the originator of the idea of life-boat steamers; and the inventor of a timber-bending machine, iron keelsons for wooden ships, bilge keels to prevent rolling, triple screws for great speed, and improved rivets.

GRIGGSVILLE, a city of Pike county, Ill., 4 miles west of the Illinois River. It has manufacturing of implements, carriages and flour. Pop., 1,400.

GRIGORIOPOL, a town of Kherson, South Russia, on the left bank of the Dniester, eighty-two miles northwest of Odessa. Its 7,918 inhabitants cultivate tobacco, wine and fruit.

GRIGSBY, HUGH BLAIR, born in Norfolk, Va., November 22, 1806; represented his native county in the legislature and State convention and devoted himself to literature. In 1871 he became chancellor of William and Mary College. He died April 28, 1881.

GRIMES, JAMES WILSON, statesman, born in Deering, Hillsborough county, N. H., Oct. 20, 1816, died in Burlington, Ia., Feb. 7, 1872. He graduated at Dartmouth College in 1836, and soon afterwards settled to the practice of law in Burlington, Ia., in what was at that time known as the "Black Hawk Purchase," which was attached to the territory of Michigan. After the formation of Iowa Territory, Mr. Grimes was a delegate to its assembly in 1838 and 1843, and in 1852 was a member of the State legislature. Elected governor of the State in 1854, he fostered Free-soil sentiments, addressed a remonstrance to President Pierce against outrages perpetrated in Kansas upon former citizens of Iowa, and secured action upon measures which materially promoted the development of the State. He was elected to the United States Senate as a Republican in 1859, was a delegate to the peace convention in 1861, and in 1865 was reelected to the Senate. As a member of the committee on naval affairs he became a recognized authority on matters pertaining to the navy, and was the first in the Senate to suggest the introduction of iron-clad vessels. Mr. Grimes was compelled by failing health to resign his seat in the Senate in 1869.

GRIMKÉ, SARAH MOORE, born in Charleston, S. C., Nov. 6, 1792, died at Hyde Park, near Boston, Mass., Dec. 23, 1873. Becoming convinced of the evils of slavery, she left her home and in 1821 went to Philadelphia, where she became one of the most prominent members of the Anti-Slavery Society.

GRIMKÉ, THOMAS SMITH, LL.D., born at Charleston, S. C., Sept. 26, 1786, died near Columbus, Ohio, Oct. 11, 1834. He graduated at Yale College in 1807, studied law in Charleston, and attained distinction at the bar. As a member of the State Senate he made a notable speech in support of the general government on the tariff question, and an argument on the South Carolina test-oath question. He was a strong advocate of the temperance cause, a distinguished member of the American Peace Society, and a fine classical scholar. Author of *Addresses on Science, Education and Literature* (1831).

GRINNELL, a city of Poweshiek county, Iowa, 120 miles west of the Mississippi River. It is the seat of Iowa College, and has a foundry, flour mills, and a glove factory. Pop. (1890), 3,332.

GRINNELL, HENRY, born in New Bedford, Mass., in 1800, died in New York city, June 30, 1874. He graduated at the academy in his native place in 1818, and going to New York became a clerk in a commission house. In 1825 he was made a partner in the firm of Grinnell, Minturn & Co., retiring from business in 1852. He was greatly interested in Arctic exploration, and in 1850 fitted out two vessels at his own expense to aid in the search for Sir John Franklin and his companions. He also contributed freely to subsequent expeditions. Mr. Grinnell was throughout life a generous advocate of the interests of sailors, and was the first president of the American Geographical Society.

GRINNELL, MOSES HICKS, brother of Henry, born in New Bedford, Mass., March 3, 1803, died in New York city, Nov. 24, 1877. He was educated at private schools and at the Friends' Academy, and in 1818 entered a New York counting-house. He became a member of the firm of Fish & Grinnell in 1825; was a member of Congress, 1839-41; collector of the port of New York, 1869-70, and president of the chamber of commerce in 1843. He contributed toward Dr. Kane's Arctic expedition of 1853, and was a liberal supporter of the national cause during the civil war.

GRINNELL LAND, a barren mountainous Polar tract on the west side of Kennedy channel, the northern continuation of Smith's Sound. It was discovered by Dr. Hayes of Kane's expedition in 1854, and named after Henry Grinnell, of New York, who had fitted out the expedition. It was thoroughly explored by Greely in 1882. North and south it is covered with ice caps; between them lie valleys that are free of snow in summer and support herds of musk oxen and the usual Arctic fauna. In the interior he discovered Lake Hazen, 60 miles long, and two ranges of mountains, one containing a peak, Mount Arthur, 5,000 feet high.

GRIPING, or GRIPES, a popular name for all painful affections of the bowels, whether attended with constipation or diarrhoea. When pains of this kind are spasmodic they are termed colic. The action of purgative medicine is often attended by more or less griping pain, which may be averted in certain cases by the careful choice of the medicine, or by the combination of it with carminatives, or with a little opium.

GRIPPE, LA. See INFLUENZA, in Britannica, Vol. XIII, p. 73; also, in these Revisions and Additions.

GRIQUAS, a South African race of half-castes, the offspring of Hottentot and Bush-women by colonists of Dutch descent. They form a distinct community in a region known as Griqualand, annexed to Cape Colony in 1874. Many of the Griquas are considerably civilized, have adopted the Christian religion, and are successful agriculturists and cattle-breeders.

GRISCOM, JOHN HASKINS, M. D., born in New York city, Aug. 14, 1809, died there April 28, 1874. He graduated from the medical department of the University of Pennsylvania in 1832; was professor of chemistry in the New York College of Pharmacy from 1836 to 1840, and in 1843 became visiting physician of the New York hospital. Author of *Animal Mechanism and Physiology* (1839); *Uses and Abuses of Air* (1850); *Prison Hygiene* (1868); and other works. He also contributed largely to the medical journals.

GRISEBACH, AUGUST HEINRICH RUDOLPH, a German botanist, born at Hanover in 1814, died May 9, 1879. He studied botany and medicine at Göttingen and Berlin; was employed by the government in 1839 to explore the flora of Turkey; traveled extensively in pursuit of this mission, and in

1841 was appointed professor of botany at Göttingen and director of the botanical garden. He published *Reisedurch Rumelien* (2 vols., 1841); *Spiegleium Flora Rumelicae* (2 vols., 1843-45); *Ueber die Bildung des Torfs* (1846); and *Die Vegetationslinien des nord-westlichen Deutschlands* (1846), etc.

GRISI, GIULIA, a celebrated singer, born at Milan in 1810, died at Berlin in 1869. Her fame spread rapidly over Europe; in 1832 she appeared in Paris in *Semiramis*, where the purity, melodiousness and volume of her voice, as well as her classical beauty of features, secured general admiration. Bellini's *Puritani* and other operas were written for her, but *Norma* always remained her greatest part. London was the scene of her grandest and most successful performances; and here she married, in 1836, the Marquis de Melce, after whose death she became in 1856 the wife of the tenor, Mario, with whom she sang in America.

GRIS-NEZ CAPE, a headland in the French department of Pas-de-Calais, opposite Dover, and the point of land nearest to the English shore, the distance being barely 20 miles. About equally distant from Calais on the northeast and Boulogne on the south, the cape marks the dividing line between the North Sea and the English Channel. It is surmounted by a light-house.

GRISWOLD, ALEXANDER VIETS, D. D., born at Simsbury, Conn., April 22, 1766, died at Boston, Mass., Feb. 15, 1843. He first studied law, but, disliking the profession, prepared for the ministry, and was ordained in 1795. He had charge successively of the parishes of Plymouth, Harwinton, and Litchfield, Conn., and in 1804 accepted a call to the rectorship of St. Michael's church, Bristol, R. I. In 1811 he was consecrated first bishop of the eastern diocese of the Protestant Episcopal church, and on the death of Bishop White in 1836 became the presiding bishop. He published *Discourses on the Most Important Doctrines and Duties of the Christian Religion* (1830); *The Reformation and the Apostolic Office* (1843); and various special sermons and addresses.

GRISWOLD, RUFUS WILMOT, D. D., born at Benson, Vt., Feb. 15, 1815, died in New York city, Aug. 27, 1857. In early life he traveled in the United States and Central and Southern Europe; was apprenticed to a publisher, but tiring of the business studied theology, and became a successful minister of the Baptist denomination. Leaving the ministry for journalism, he edited "Graham's Magazine," Philadelphia, from 1841 till 1843; was afterwards associate editor of several weekly papers in Boston and New York city, and in 1852 became editor of the "International Magazine." His works include *Poets and Poetry of America* (1842); *Poets and Poetry of England in the 19th Century* (1845); *Washington and the Generals of the Revolution*, in connection with other writers (1847); *Sacred Poets of England and America* (1849); and a number of other works. He also compiled *Curiosities of American Literature*, edited the first American edition of Milton's prose works, and was one of the editors of the works of Edgar A. Poe.

GRISWOLDVILLE, a village of Jones county, Ga., on the Central Railroad, 10 miles from Macon. Before the civil war it was noted for extensive manufacture of cotton-gins. Here a sharp engagement occurred, between the Confederate and Union forces, Nov. 22, 1864.

GRODEK, a town of Austrian Galicia, 20 miles from Lemberg, in the center of a flax-growing region. Population (1880), 10,116; nearly one-third Jews.

GROOTE EYLANDT (Dutch, "Great Island"); an uninhabited island on the west side of the Gulf

of Carpentaria, in North Australia. It is surrounded by reefs, and its interior is hilly. In extreme length and breadth it measures about 40 miles each way.

GROS-VENTRE INDIANS. See INDIANS, AMERICAN, in these Revisions and Additions.

GROSS, SAMUEL DAVID, M. D., born near Easton, Pa., July 8, 1805, died in Philadelphia, May 6, 1884. He graduated at Jefferson Medical College in 1828, in 1835 became professor of pathological anatomy in the Cincinnati Medical College, Ohio; in 1840 accepted the professorship of surgery in the University of Louisville, Ky., and in 1850 was chosen Dr. Mott's successor in the University of New York. Six years later he became professor of surgery in Jefferson Medical College, Philadelphia, which position he held until within two years of his death. Dr. Gross was a member of the Royal Medical Society of Vienna; of the Royal Medico-chirurgical Society of London; and of the British Medical Association. He was president of the American Medical Association in 1867, and president of the International Medical Congress held in Philadelphia in 1876. He received the degree of D. C. L. from the University of Oxford, England, and that of LL. D. in this country. He commenced in early life to contribute to medical literature, and was the author of a number of well-known professional works.

GROSS, SAMUEL W., son of the foregoing, was born in Cincinnati in 1831, served in the Union army as brigade surgeon, and was brevetted lieutenant-colonel. He was attached to several colleges in Philadelphia as surgeon and professor of clinical surgery, and has written many valuable papers on anatomy and diseases of various organs.

GROSS, WILLIAM HICKLEY, born in Baltimore, June 13, 1837, entered the Redemptorist order in 1857, and was ordained priest in the Roman Catholic Church in 1863. On April 27, 1873, he was consecrated bishop of Savannah, and in 1884 became archbishop of Oregon.

GROTTE, LE, a town of Sicily, in the province of Girgenti. Population, 8,775, mostly employed in the sulphur works of the district.

GROUND-ANNUAL: in the law of Scotland, an annual payment made for land. It is little known where the law allows the constitution of a feuduty. Thus, when a vendor sells his land, and instead of taking a lump sum for the price prefers a sum by way of a perpetual annuity or rent, he conveys the land in fee to the disponent or purchaser subject to this ground-annual, which is the burden on the lands transferable and extinguishable like other real burdens. The vendor is then called the ground-annualler, and if the ground-annual is not paid he is entitled, as a remedy, to poind the ground—that is, seize all the goods whether of the owner or his tenants, which are found on the lands, and pay himself, and raise action of mails and duties against the tenant, or he may sue the debtor.

GROUND DOVE, a dove or pigeon, which lives chiefly upon the ground. In the United States it is one of several small pigeons of the genus *Columbigallina*, especially *C. passerina* of the Southern States. It is less than seven inches long, has short broad wings and tail, and naked tarsi. The plumage of the male is varied with tints of purplish-red and grayish-olive; the female is gray in color. It usually nests on the ground.

GROUND-IVY (*Glechoma hederaceae*), a plant of the natural order *Labiatae*, a native of Britain and other parts of Europe, growing in hedges, etc., in a dry soil, and naturalized in America. It has a creeping stem, kidney-

shaped crenate leaves, and axillary blue flowers growing in threes. A tea prepared from the leaves is in great repute among the poor in many places, and the plant is supposed to be stimulant, aromatic, and of use in pectoral complaints. The leaves were formerly used in England for clarifying and flavoring ale.

GROUNDLING (*Cobitis taenia*), the spinous loach, a little cyprinoid fish resembling the loach, from which it is distinguished by a forked erectile spine beneath the eye, and by its more compressed form. It is rare and very local in Britain, frequenting the muddy parts of rivers, habitually keeping close to the bottom. The genus is known to include only two other species.

GROUND PARAKEET, one of several Australian parrots, living mainly upon the ground, and belonging to the genus *Pezoporus*, or the genus *Geopsittacus*.

GROUND SQUIRREL, one of the various species of burrowing rodents of the genera *Tamias* and *Spermophilus*, especially applied in the United States to the Eastern striped squirrel or chipmunk, *Tamias striatus*. The genus *Spermophilus* includes the prairie squirrel and many allied Western species, commonly called gophers.

GROVE, SIR GEORGE, an English author, born in 1820. He was trained as an engineer, and erected in the West Indies the first two cast-iron light houses built. He was next employed on the Chester general station and the Britannia tubular bridge. From 1849 to 1852 he was secretary of the Society of Arts, and to the Crystal Palace company from 1852 to 1873. He was knighted in 1883 on the opening of the Royal College of Music, Kensington Gore, of which he was made director by the Prince of Wales. He assisted Dean Stanley in some of his works on the Bible and the East, and was founder of the Palestine Exploration Fund. He was an editor of "Macmillan's Magazine," a contributor to Smith's *Dictionary of the Bible*, and an editor (and part author) of the great *Dictionary of Music and Musicians*.

GROVE, SIR WILLIAM ROBERT, an English lawyer and physicist, born in 1811. In 1835 he was called to the bar; in 1871 was raised to the bench, receiving knighthood in 1872; and in 1875 became a judge in the high court of justice. He retired from the bench in 1887. In 1839 he invented the powerful voltaic battery known by his name, and from 1840 to 1847 was professor of natural science at the London Institute. He has contributed extensively to scientific journals, and published several very important lectures. He was president of the British Association in 1866.

GROW, GALUSHA A., born at Ashford, Windham county, Conn., Aug. 31, 1824, graduated at Amherst College in 1844, studied law, and was admitted to the bar in 1847. He was member of Congress from Pennsylvania in 1851, and represented his district for twelve successive years. Elected as a Democrat, he severed his connection with his party on the repeal of the Missouri compromise. During his period of office he rendered important services on various committees, and was Speaker of the House in 1861-63. He was a delegate to the National Republican conventions of 1864 and 1868.

GROWLER (*Grystes salmonoides*), a fish of the perch family, abundant in many of the rivers of North America. It attains a length of two feet, and is much esteemed for the table. It is of an olive color. The genus *Grystes* has small scales, and only fine villiform teeth. Nearly allied is the genus *Oligorus*, including the valuable murray cod (*O. macquariensis*), which may attain a length of three feet and a weight of a hundred pounds, and a

New Zealand coast form, the hapuku (*O. gigas*), also valuable as a food-fish.

GRUB, the name generally applied to the worm-like larvæ of insects when they have a distinct head but no legs, as bees and some beetles. The economic importance of many grubs, especially those of some beetles, is well known.

GRUNDY CENTRE, the capital of Grundy county, Iowa, situated on a railroad, about 22 miles from Cedar Falls.

GRUNDY, FELIX, born in Berkeley county, Va., Sept. 11, 1777, died in Nashville, Tenn., Dec. 19, 1840. He was educated by Dr. Joseph Priestly at Bardstown Academy, studied law, and achieved a great reputation as a criminal lawyer. He was chosen a member of the Kentucky constitutional convention in 1779, was a member of the legislature from 1799 till 1806; in the latter year was appointed a judge of the supreme court of errors and appeals, and in 1807 became chief justice. This position he soon after resigned, removing to Nashville, Tenn. He was a member of Congress (1811-15), United States Senator (1829-38), and Attorney-General in Van Buren's Cabinet. In 1840 he resigned his position in the cabinet and was reelected to the Senate.

GUACHOS, a name given to descendants of the early Spanish colonists and native Indians, inhabiting the pampas of South America. They live in mud huts, and are solely occupied in rearing cattle.

GUADALUPE RIVER rises in the southern part of the State of Texas, and flows in a southeast direction, emptying its waters into Espiritu Santo Bay. Its length is estimated at about 200 miles.

GUADALUPE-Y-CALVO, a town of Mexico, situated in a mountainous district in the State of Chihuahua. It derives importance from the rich silver-mines in its vicinity. Population, 10,000.

GUANARE, the capital of the State of Zamora, in Venezuela. It stands on a river of the same name, and has a population of 10,890.

GUANO, or VILLA GUANO, a town of Ecuador, province of Chimborazo, situated on the Rio Guano, 100 miles southwest of Quito. It produces various manufactures. Population, 9,000.

GUAPORÉ, a navigable river of South America, rising in Brazil, and for some distance forming the boundary between Bolivia and Brazil. It unites with the Mamore to form the Madeira.

GUARANTY, a term in international law applied to the promise given by the third power of a treaty to aid in case of the violation of its provisions by either of the others. It requires that the degree and amount of aid promised shall be given unless the promisee decline to receive it. The promiser differs from a surety in not being bound to make good a debt, but only to do his best to induce the party owing it to make payment. See *Britannica*, Vol. XI, p. 236.

GUADAFUI, CAPE, the most eastern point of the African continent, and the extremity of an immense promontory (the Somali country), stretching seaward in an east-northeast direction, and washed on the northwest by the Gulf of Aden and on the southeast by the Indian Ocean. The cape is in 11° 50' N. lat., and 51° 14' E. long.

GUATEMALA, a republic of Central America, long in an unsettled condition, politically. For its history and natural features, see *Britannica*, Vol. VIII, pp. 238-242. Guatemala is divided into twenty-two departments, under civil governors. The executive is vested in a president, elected for six years by direct popular vote; he appoints six secretaries of state, who with nine others form the council. The assembly is elected by universal suffrage, to the number of one for every 20,000 of

the population. The standing army consists nominally of 3,700 men, the militia of nearly 65,000. This force is a heavy drain on the resources of the country, whose finances are not in a flourishing condition. In 1890 the net public revenue was \$6,638,336, and the expenditure was \$8,300,338; but the internal debt was returned at \$6,495,062, the floating debt at \$5,554,995, and the foreign debt at \$4,613,500—making a total of \$16,663,557, including past interest. To meet the increase in the floating debt, which had grown up since 1887, in 1889-90 about three million dollars of paper money was put in circulation. On the other hand, since 1887 the interest on both the internal and the foreign debt has been punctually paid, and the bonds have risen in value.

From 1871 until he was killed in a war with Salvador in 1885, General Barrios was president, and under his iron rule the country made considerable progress; monastic orders were rigorously suppressed, and much of the church property was confiscated and appropriated to the uses of public education and for other purposes. There have been three or four nominal presidents, and as many revolutions, since the death of Barrios. There are at present only two short lines of railway (100 miles) in operation; a line from Puerto Barrios, on the Atlantic, to Guatemala city, to connect the Atlantic with the Pacific, was commenced in 1884, but in the meantime has been abandoned. In 1888 there were in the republic 157 post offices, and over 2,000 miles of telegraph. In May, 1892, President Harrison concluded a treaty of commercial reciprocity between the United States and Guatemala. Our imports from that country consist of coffee, dyewoods, rubber, indigo and drugs. We export to it a few manufactured goods, but its chief market is Great Britain.

GUELPH, a post-town of Ontario, Canada, county-seat of the county of Wellington, on the Speed, at a railway junction, 48½ miles west of Toronto. The Speed here falls about 30 feet, furnishing water-power to several large mills and factories. The town has also manufactories of iron castings, machinery, sewing-machines, musical instruments, leather, agricultural implements, soap and candles, boots and shoes, and wooden-ware. Guelph is an inland port of entry. Population in 1886, 10,216.

GUERANDE, a town of France, in the department of Loire-Inférieure, near the sea. It contains a mediæval church, and has manufactories of salt and linen. Population, 6,912.

GUERARA, a town of Algeria, in the oasis of Wady-Mزاب, 42 miles from Gardaia. It is the rendezvous for the tribes of the desert to buy and sell horses, sheep, and asses, and to exchange ivory, gold dust, and ostrich feathers for cottons, woollens, silk, and cutlery. Population estimated at 12,000.

GUERICKE, HEINRICH ERNST FERDINAND (1803-78), a German theologian belonging to the Old Lutheran school. He was professor at Halle, and is the author of a *Handbuch der Kirchengeschichte* (1853); of a *Christliche Symbolik* (1839); and of a *Lehrbuch der Christlichen Archæologie* (1847).

GUERRERO, VICENTE, President of Mexico, born in Tixtla, Mexico, in 1783, died in Cuilapam, Feb. 14, 1831. He took part in an insurrection in 1809; subsequently gained several victories over the Spaniards, and in 1818 became a leader of the patriotic troops. In 1829 he was declared President of Mexico. He was soon afterwards deposed in favor of Santa Anna and fled to the south, but was afterwards captured and shot.

GUERRILLA, properly an armed band carrying on an irregular, unauthorized warfare on occasions

of invasion or civil war, but now commonly an individual member of such a band. The word first came into popular use in Spain, where it was applied to the bands of peasants and shepherds who opposed Napoleon's armies in 1808-14; and they were active partisans of the Carlist cause in the civil wars of Spain. The name was brought to Spanish America, and thence introduced into the United States. In the late civil war there were numerous guerrillas in the border States.

GUESS, GEORGE, or SEQUOYAH, a Cherokee half-breed, inventor of the Cherokee alphabet, born about 1770, died in San Fernando, Northern Mexico, in August, 1843. He knew no language but his own, and was only known as an ingenious silversmith previous to his invention of the alphabet. This alphabet is considered to be the most perfect one ever devised, and consists of eighty-five characters, each representing a single sound. It has been employed in printing with complete success. Guess went with his tribe beyond the Mississippi, and emigrated with other Indians to Mexico in 1842.

GUEUX, or "THE BEGGARS," the name assumed by the confederated nobles who opposed the introduction of the Inquisition into the Low Countries by Philip II, of Spain. Forming themselves into an association, they presented a formal protest to the regent, Margaret of Parma. They represented the national feeling of the country, and maintained a long and vigorous contest against the despotic proceedings of Philip, but were compelled to succumb to superior force. "The Beggars of the Sea" seriously harassed the Spanish fleet, and succeeded besieged places along the coast. Their capture of Briel in April, 1572, was the beginning of the war which terminated in the independence of the Netherlands in 1648.

GUIANA, or GUAYANA, a region of South America comprised between the Orinoco and Amazon Rivers (see Britannica, Vol. XI, pp. 249-55). The name is now usually confined to the European provinces, British Guiana, Cayenne, or French Guiana, and Surinam, or Dutch Guiana. Guiana was the "El Dorado" of Sir Walter Raleigh, and formerly supposed to be rich in gold. Gold is still found in the interior, in the Sierra Parime, but the true wealth of Guiana lies in its fertile soil and its boundless capabilities in regard to tropical produce. Much of the interior is still unexplored.

BRITISH GUIANA has an area of 109,000 square miles, and a population (1891) of 284,887. In 1890 there were 81,486 acres under cultivation, as follows: Sugar, 78,110 acres; village acres, 12,833; and 92 cattle farms. The exports and imports for five years (1886-90) were as follows:

Goods.	1886.	1887.	1888.	1889.	1890.
	£	£	£	£	£
Exports	1,842,585	2,190,562	2,024,733	2,310,141	1,842,585
Imports	1,436,297	1,603,175	1,566,055	1,803,776	1,436,297

The chief exports in 1890 were: Sugar, £1,914,143; rum, £165,854; molasses, £66,020; timber, £18,978; gold, 28,282 oz., valued at £109,234. The chief imports were: Flour, £136,899; rice, £192,065; pork, £56,888; butter, £18,868; lumber, £38,538. In 1889 there were 23 miles of railway, 275 miles of post office telegraphs, and a telephone exchange in George Town of 240 miles, with 200 subscribers.

CAYENNE, or FRENCH GUIANA, has an area of 46,697, and a population of 26,502. The capital and

chief city is Cayenne. The exports to France amount to about \$3,750,000 annually. Cayenne was selected as a station by the Royal Astronomical Society as a point of observation of the total solar eclipse, Dec. 21 and 22, 1889.

SURINAM, or DUTCH GUIANA, has an area of 46,060 square miles, and a population (1889) of 57,365. The capital and chief city is Paramaribo, with 27,752 inhabitants. The superior administration and executive authority is in the hands of a governor, assisted by a council composed of the governor as president, the attorney-general as vice-president, and three members, all nominated by the king. The colonial states form the representative body of the colony. Four members are chosen every year by the governor; the others by electors, in proportion of one in 200 electors. Entire liberty is granted to the members of all religious confessions. The local revenue is derived from import, export and excise duties, taxes on houses and estates, personal imposts, and some indirect taxes. A subvention from the mother-country is necessary. For 1890 the estimated revenue was 13,408,130 guilders, and the expenditures 1,647,153 guilders. The following table shows the value of imports and exports during the years 1885-89:

Year.	Imports.	Exports.
1885	4,808,603 guilders.	3,113,270 guilders.
1886	4,592,714 "	3,036,533 "
1887	5,052,621 "	3,639,509 "
1888	4,346,840 "	3,316,377 "
1889	4,893,355 "	3,521,867 "

In 1889 sugar was produced on 114 plantations of 1,668 hectares to the amount of 7,507,649 kilogrammes. Cacao on 88 plantations and 370 small properties of 8,787 hectares, to the amount of 1,543,019 kilogrammes. The other productions were bananas, 516,799 bundles; coffee, 5,560 kilogrammes; cotton, 720 kilogrammes; rice, 15,197 kilogrammes; fruits, 186,812 kilogrammes; rum, 315,306 litres; and melasse, 1,104,389 litres. The export of gold in 1889 was 894,333 grammes, valued at 1,410,795 guilders. The declared value since the beginning of the gold industry (1876) to the end of 1889 is 12,472,808 guilders.

GUIANA BARK, FRENCH, the bark of *Portlandia hexanára*, also called *Conteria speciosa*, a tree of the natural order *Cinchonaceæ*, with opposite ovate leaves, and corymbs of very large purple flowers, a native of Guiana. The bark is esteemed a very powerful febrifuge.

GUIDES, in military affairs, are usually persons drawn from the country in which an army is operating, one or more being sent with every detachment of troops. A guide should be intelligent, experienced in the topography of the country, and faithful. As, however, guides must on many occasions be drawn from a hostile population, their conduct is always watched with the utmost jealousy, death being the punishment for the least departure from trustworthiness.

GUIGNIAUT, JOSEPH DANIEL, a French scholar and antiquary, born at Paray-le-Monial, May 15, 1794, died in Paris, March 12, 1876. In 1818-22 he held the position of *maître des conférences* in history at the normal school, and the corresponding chair in Greek letters, 1826-28. He was chosen to the Academy of Inscriptions in 1837, and in 1862 was made its perpetual secretary; in 1847 received the cross of an officer of the Legion of Honor. He wrote much on Greek literature.

GUITEAU, CHARLES JULES, assassin of President Garfield, was born in Freeport, Ill., Sept. 8, 1841. He was admitted to the bar, but achieved no success as a lawyer, and published some pamphlets setting forth his views on various moral questions, which were of the most erratic character. He married, but his wife obtained a divorce from him, and he obtained a precarious living by lecturing and writing. He had been a member of the Oneida Community, but was expelled from that body. Guiteau became an office-seeker and persistently solicited an appointment as consul from President Garfield. Enraged at being refused, he lay in wait for the president and shot him, July 2, 1881. He was tried in Washington, D. C., found guilty of murder, and executed June 30, 1882.

GULES (*gueules*, the French heraldic term for "red," is the plural of *gueule*, "the mouth." Lat. *gula*), the term by which the color red is known in heraldry.

GULFWEED (*Sargassum*), a genus of seaweeds (*Algæ*), of the sub-order *Fucaceæ*, of which two species are found in immense quantities in some parts of the Atlantic, Pacific and Indian Oceans. They are tropical plants, although sometimes carried by winds and currents to northern coasts. The frond is long, and is furnished with distinct stalked nerved leaves, and simple axillary stalked air-vessels. The receptacles are linear, in small axillary clusters or racemes. The gulfweed is generally found floating, but there is reason to think that it is at first attached to the bottom of shallow parts of the sea.

GULL, SIR WILLIAM WITHEY, was born in 1816, at Thorpe-le-Soken, Essex. He was educated privately, and subsequently pursued his medical studies at Guy's Hospital. He graduated M. D. in 1846, at the London University. Doctor Gull was professor of physiology at the Royal Institution of Great Britain in 1847-9; was elected a fellow of the Royal College of Physicians in 1848; and for twenty years acted as physician and lecturer to Guy's Hospital, retiring from that position about 1867. In 1872, he was created a baronet, in recognition of services rendered by him during the illness of the Prince of Wales, and in the following month was appointed one of her majesty's physicians extraordinary. He held other positions of honor and profit and wrote some medical works of high value. His specialty was in clinical practice. He died in 1890, leaving the largest fortune ever amassed by a practicing physician.

GUMMING (in vegetable pathology, *Gummosis*), a disease which attacks the plum, cherry, peach, and other stone-fruit trees, often proving fatal to the tree. Recent observations seem to prove that the cause of the disease is a fungus named *Coryneum Beijerinckii*. The mycelium of the fungus develops a ferment which transforms the cell-walls, starch granules, and other contents of the cells into gum. The fungus cannot penetrate sound, healthy bark; there must be some wound or abrasion before the germ-tubes can enter the cellular tissues in which alone they can spread; probably insects are the chief agents in carrying the contagion from tree to tree. Wounds as soon as they are observed should be coated with a thick paste of quicklime or coal-tar. Gummed branches should be cut away without delay and burned, and the wounds dressed at once with coal-tar.

GUM-PLANT (*Grindelia robusta*). This plant is one of a genus of the order *Compositæ*, named in honor of Dr. Grindel, a German botanist. It inhabits the dry regions of the American continent from the Mississippi River to the Pacific coast. There are about 25 species of *Grindelia*. Some are

found as far north as the Saskatchewan, in the British possessions, while Patagonia seems to be the limit on the south. The chief home of the gum-plant seems to be in Texas and Mexico. It has a pappus composed of 2 to 8 rigid, hornlike awns, which are early deciduous. The leaves are rather thick, and often covered by a viscid exudation, or gum. California has four species of this genus. In medicine it has gained popularity in the West as a remedy for poisoning by species of *Rhus*, as the poison-oak of California, and in asthma and bronchitis.

GUM-TREE, a name applied in the United States to various important trees. The sour gum, black gum, pepperidge, or tupelo (*Nyssa multiflora*), is a large tree, producing a firm timber, which is used for hat-blocks, windmill shafts, hubs, etc. The *Nyssa capitata* bears a sour, edible fruit. The *Nyssa uniflora* and *aquatica* have soft, light wood, and their roots are used somewhat as substitutes for cork. The *Liquidambar styraciflua*, the sweet gum, is a large tree with star-like leaves. The firm and fine-grained wood is used in furniture-making. It yields a balsamic resin, called American storax. *L. orientale* and *L. altingia* also yield storax, and the latter has a hard, heavy, fragrant red timber. Gum-trees are common in nearly every quarter of the globe.

GUNBOAT, a small boat or vessel armed with one or more guns of heavy caliber. From its small dimensions, it is capable of running close inshore or up rivers, and from the same cause it has little chance of being hit by a larger vessel at the long range which the carrying power of its guns enables it to maintain. At the outbreak of the Russian war, a large squadron of them was hastily constructed for the British navy for the first time. Their tonnage was small; and their armament usually consisted of one 8-inch gun and one 100-pounder Armstrong gun. Gunboats in their more modern form are small, mastless vessels mounting one large gun in the bow, and propelled by an engine with single or twin screws. The gun is pointed by means of the helm or the screws, and the gunboat is in fact a floating gun-carriage. In the British navy these gunboats carry an armor-piercing gun of 18 tons, on a draught of only 4 feet. But they have been designed to carry 35-ton guns, or heavier. In 1893 there were on the British Navy List 114 of these vessels, of which 43 were called third-class, and are intended for coast defense. The largest size of the first-class gunboats then in commission or building were of 735 tons and 4,500 horse-power. At the beginning of the century the United States had over 250 of these vessels; but the "gunboat system" was soon abandoned. In 1893 there were attached to the United States navy only six vessels called gunboats, all of the fourth rate, and including one torpedo ram; and two gun-vessels of 1,200 tons, newly built. Most continental navies are provided with gunboats of various size and construction.

Following are the names and description of the six vessels listed as gunboats in the "new" navy of the United States, Jan. 1, 1893:

Yorktown—Gunboat; D., 1,700; H. P., 3,500; cost, c\$455,000. Armament, 6.6-in. B. L. R.; 2 6-pdr., 2 3-pdr., 1 1-pdr. R. F.; 2 37-mm. H. R. C.; 2 Gatlings. In commission.
Petrel—Gunboat; D., 890; H. P., 1,513.41; cost, c\$247,000. Armament, 4.6-in. B. L. R.; 2 3-pdr., 1 1-pdr. R. F.; 2 37-mm. H. R. C.; 2 Gatlings. In commission.
Concord—Gunboat; D., 1,700; H. P., 3,405; cost, c\$490,000. Armament, same as Yorktown. In commission.
Bennington—Gunboat; D., 1,700; H. P., 3,533; cost, c\$490,000. Armament, same as Yorktown. In commission.
Machias—Gunboat; D., 1,050; H. P., 1,600; cost, c\$318,500. Armament, 8 4-pdr. R. F. B. L.; 4 6-pdr., 2 1-pdr. R. F.; 2 Gatlings. Completing at Bath Iron Works.

Castine—Gunboat; D., 1,050; H. P., 21,600; cost, c\$318,500. Armament, same as *Machias*. Completing at Bath Iron Works.

The initials, etc., used in the descriptions are explained as follows:—

a Estimated. b Limit of cost. c Contract price. D displacement. R. F. B. L. R. Rapid-firing breech-loading rifles. B. L. R. Breech-loading rifles. R. C. Revolving cannon. R. F. Rapid-firing cannon. mm. Millimetre, 39-1000ths of an inch.

GUN COTTON. There are now a very large number of explosive nitro-compounds, which may be divided into two main classes, viz., (1) those containing nitro-glycerin, in which is included the great dynamite class, and (2) those not containing nitro-glycerin. Gun cotton is an explosive nitro-compound of the latter class, and is by far the most important of the class.

Schönbein's discovery of gun cotton in 1845 gave a great impetus to the question and experiments continued to be made by many eminent chemists in nearly every country in Europe, with the idea of utilizing the new explosive for military purposes. It was first manufactured in England on a large scale in the year 1847 by Messrs. Hall & Son, of Faversham; but, in addition to the minor accidents, a terrible explosion took place in their works, which created so much distrust that the manufacture in England was discontinued for several years, as the cause of the explosion, with the then imperfect knowledge possessed of the subject, could not be satisfactorily accounted for. The first country to turn Schönbein's discovery to practical account was Austria. General Von Lenk, an Austrian artillery officer, after extensive trials succeeded in greatly improving the method of manufacture, by which means he was enabled to moderate and insure a uniform rate of combustion of gun cotton in air. His discovery was considered of so much importance that in the year 1852 several batteries of Austrian artillery were armed with gun cotton cartridges. But it soon fell into disrepute, not only on account of its unstable nature, but also because it was found that Von Lenk's improvements were of no practical utility when the gun-cotton was confined in the bore of a gun; the great heat generated caused the inflamed gas to penetrate rapidly through the whole cartridge, so that there was little or no retardation in the rate of combustion, and the rapid combustion caused excessive pressure in the bore, besides giving very unequal results when fired.

Since the failure of the Austrian cartridges, gun cotton has not been used as a propelling agent on a large scale. But its utility as a disruptive agent has been enormously increased by the discoveries of Professor Sir Frederick Abel and the late Mr. E. O. Brown. Nothing daunted by the failure of the Austrian experiments, nor by the explosion at Messrs. Hall's works, Sir Frederick Abel continued his experiments, and he ultimately discovered a method of manufacture whereby not only a complete purification from free acid is assured, but the material is converted into thoroughly compact homogeneous masses.

The properties of gun cotton as compared with gunpowder, are mainly as follows: (1) It can be ignited at a temperature of about 800°, whereas gunpowder requires a temperature of about 600° to insure ignition; (2) its combustion leaves no solid residue, and is unattended by smoke; (3) the action of gun cotton is much more rapid than that of gunpowder, and, as has already been pointed out, it is this rapidity of combustion which renders it unsuitable to be used as a propelling agent in cannon; (4) whereas gunpowder is greatly influenced and injuriously affected by moisture, gun cotton

on the contrary is perfectly uninjured, and may be kept for any length of time in water without change. For military purposes this is a most important consideration. Apart from the question of using gun cotton as a propelling agent, its value for destructive purposes was incontestable, but it was thought to be necessary, in order to develop its full power, that the charge should be strongly confined.

The discovery with regard to its detonation when in a wet state has led to this material being used as the charge for torpedoes and submarine mines. The first pattern of Whitehead torpedo was 14 feet long and 16 inches in diameter; the speed of the torpedo was 9 knots for 200 yards, and the charge was 118 pounds of compressed, wet gun cotton. Several subsequent patterns of torpedoes have been introduced, the latest being 14 feet long and 14 inches in diameter, and by reducing the charge of gun cotton to 80 pounds, the high speed of 27 knots for 600 yards has been attained. The immense importance of this increased speed can be readily appreciated, as it enables a torpedo to strike the vessel at which it is discharged before she has time to get out of the way. The torpedoes are fired by a striker actuated by a spring which is released on the torpedo striking the side of the ship; the striker is pointed, and penetrates a cap charged with 38 grains of fulminate; the cap is embedded in an 8-ounce disc of dry gun cotton, enclosed in a hermetically-sealed case, and placed as nearly as possible in the center of the wet gun cotton charge containing 12 per cent. of water. Gun cotton is also used as the charge of submarine mines, the charge consisting of from 50 to 500 pounds of wet, compressed gun cotton.

There are various descriptions of marine mines, (1) ground mines: in these the charge is contained in a case of sheet steel, with cast-iron sinkers attached to it to keep it at the bottom of the harbor or river; these mines are fired electrically by observation from the shore when an enemy's ship passes over them. (2) Buoyant mines: these are anchored a few feet below the surface of the water by a steel rope attached to a sunken weight; they are connected with the shore by electric wires; a buoy with a signaling apparatus is attached to the mine, and when a ship strikes a buoy it rings a bell in the signaling-room on shore; if the ship is a friendly one it is allowed to pass, but if it is an enemy's ship the mine is fired by electricity and the ship blown up. (3) Electro-contact mines: these are used only in places where an enemy's ship would pass. When the mine is struck by a passing ship a steel spring or pendulum moves towards the point of impact and thus closes the circuit and fires the mine automatically.

The French, in 1887, were the first to adopt a smokeless powder for the cartridges for their new small-bore rifle, the Lebel. It is known as Vieille's powder, or "Poudre B;" its exact composition has been kept a secret, but it is believed that picric acid is mixed with the paste as described above. The ballistics attributed to this powder when first introduced were remarkable; a charge of about 70 grains imparted a muzzle velocity of 2,000 feet per second, to a bullet weighing 230 grains, fired from a rifle-barrel whose caliber was 315. But it was found that the powder rapidly deteriorated, and that these results were only attainable with recently manufactured powder, there being a notable falling off in velocity a few months after manufacture. In consequence of this it is stated that the French in 1889 abandoned the use of this powder, and reverted to the use of a good type of black powder until they can discover a more stable one.

The Germans also in 1889 introduced a smokeless

powder for their new small-bore rifle; it is a nitrated gun cotton, but although it was very highly spoken of after the autumn maneuvers of 1889, when it was extensively tried, it is believed that, like the French powder, it is still wanting in stability, and the Germans are already endeavoring to find a better description of powder.

Several patents for smokeless powder have been taken out in England, but none of them are entirely satisfactory, so that at the beginning of 1890 the subject was still under the consideration of the Explosives Committee, to whom it has been referred by the English government; and, although the difficulty of obtaining a smokeless powder of the necessary stability has not yet been surmounted, those who have the matter in hand are confident of being able to provide such a powder.

There can, therefore, be but little doubt that, as has already been mentioned, not only in England, but also on the continent of Europe, the use of smoke-

less powder, as a propelling agent in all military firearms, will be universal.

One of the most powerful explosives known is blasting gelatine, which is made by dissolving 7 per cent. of gun cotton in 93 per cent. of nitro-glycerin; it forms a gelatinous mass somewhat resembling honey in color, and varying in consistency from a tough leathery material to a soft substance, like stiff jelly. It is stronger than dynamite, as the nitro-cellulose itself is explosive, and if made with great care, and if absolutely free from all impurities, is a safe and stable explosive. But, unless the ingredients of which it is composed are absolutely pure and free from all foreign matter, it becomes exceedingly dangerous when stored in large quantities.

GUNNISON, the capital of Gunnison county, Col., situated on a river of the same name. It is a railroad junction, and is connected by branch roads with many mining points. Pop. (1890), 1,105.

GUNS AND GUNNERY. See Britannica, Vol. XI, pp. 297-315. In speaking of guns we understand the large pieces of ordnance called cannons. Modern guns and armored ships have been mostly developed during and since our late war. The 300-pounder rifled Parrot gun and the 450 pounder smooth-bore Rodman gun were produced during the war. The latter had a bore of 15 inches, was 16 feet long, and weighed 20 tons. In 1886 a gun weighing 115 tons was produced, which throws an elongated projectile of 2,300 pounds weight to a distance of nine miles. This was constructed by Alfred Krupp, in Essen, Prussia. He and Sir William Armstrong, of Newcastle, England, constructed most of the heavy ordnance now used in Europe. Guns weighing 120 tons, and one of the latest even 139 tons, were constructed at Krupp's works since 1886. The last-mentioned gun discharges a projectile of 2,314 pounds, which penetrates wrought-iron plates nearly 4 feet in thickness when fired by a charge of 1,069 pounds of prismatic powder. For a description of this powder and the mode of its manufacture, see Britannica, Vol. XI, p. 329. Still larger guns, capable of firing shells weighing over a ton, are projected by Krupp's successor.

The Krupp guns are now all "built up" by shrinking red-hot steel hoops over a central tube of crucible steel. There is a single layer of hoops around the tube for guns below 9-inch caliber; while the guns of 9-inch caliber and upwards have two layers of hoops protecting the after-parts. The tubes and hoops are forged without weld. The chambers of the guns are slightly larger than the bores. Their rifling consists in shallow grooves, widening a little toward the breech of the gun. Sir J. Whitworth's guns are made of tubes of fluid-compressed steel, over which massive steel hoops are forced either by hydraulic pressure or by shrinkage.

In Sir William Armstrong's system of gun making, wrought-iron coils are shrunk over a central tube and over one another, so that the central tube is strongly compressed and the outer coils in a state of tension. Wrought iron being twice as strong in the direction of the fiber as across it, the hoops made up of wrought iron bars welded together can resist great circumferential strains.

GATLING'S CAST-STEEL GUN.—Dr. Gatling has invented a new steel gun, which he claims will be far superior to the built-up gun, and can be made at

half the cost. The patents consist of making guns cast from the highest grade of steel to shape around a central core. This central core is utilized for the purpose of cooling the casting from the interior while the exterior is still hot. The cooling process thus begins from the interior and works out, directly the reverse of the ordinary way. The metal is forced, as it were, from the interior outwardly, thereby avoiding the creation of a hard, resisting arch on the exterior of the casting, at which point the full intensity of the high-power force exercised by the exploding ingredients within the gun exerts itself. It makes the interior of the gun, where the greatest strain is felt, the toughest and hardest part, and the soft and spongiest part the exterior, which thus acts somewhat after the manner of a cushion. This is directly the reverse of the old style guns, in which the spongiest part is on the interior. Another important point is the method in which the metal is cast. A revolving motion is given it, which makes the grain spiral.

With regard to "quick-firing guns," we insert the following article from "Engineering:"

QUICK-FIRING GUNS.—The application of the "quick-firing" principle to guns which may fairly be classed as armor-piercing will probably do more to govern the tactics of naval commanders in any war which may arise in the immediate—if not the distant—future than any other phase of production of warlike materiel. For service on shore it has been said that: "By the aid of quick-firing guns and the position-finder we are enabled to carry out the ideal system of defense; viz., few guns in dispersed emplacements concealed by natural features. The system has long been advocated by Sir Andrew Clarke, and it is difficult to see how any further opposition can consistently be offered to it."

For the protection of mine fields the quick-firing gun would be invaluable; indeed, the authority we have just quoted considers the operations of sweeping, creeping, or counter-mining might be rendered absolutely impossible by the fire of quick-firing guns. "The only reliable defense against an assailant's in-shore squadron," continues Captain Stone, "will be the extensive employment of quick-firing guns of sufficient caliber not merely to annihilate landing or boarding parties, or to send a torpedo boat *hors de combat*, and equal to the task of putting a gunboat *hors de combat*, and either wrecking her or making it possible for the active harbor defense to capture her."

The use of shells charged with explosives more powerful than gunpowder has given additional importance to these projectiles of smaller nature, and with the increased development of higher explosives a corresponding development of shell fire may be anticipated. This has already taken effect in the science of war-ship design and naval constructors are now looking with less favor on large unarmored surfaces; and indeed the older battle-ships with comparatively thin armor, which a year or so ago were considered all but obsolete, are now considered as of some importance in view of the development of quick-firing guns and high explosive shells.

The part which the Elswick firm has taken in the introduction of quick-firing guns is well known. We give two views

of a quick-firing gun, of which the following is a description:

This weapon is the 4.7 in. simultaneous loading breech-loading gun, caliber 4.724 in., or 12 cm., firing a shell of 45 lb., with 12 lb. of P. or S. powder. The gun is entirely of steel, its total length 16 ft. 2 in., length of bore, 40 caliber; and weight, 41 cwt.

The breech is closed on the interrupted screw system, and to render the closing and opening more easy and rapid, the breech block is formed in two steps, both of which have portions of an interrupted screw on their surfaces, the threads on one step standing longitudinally opposite to the blank spaces on the other. This is well shown in Fig. 12, the breech block being there swung back. The breech block swings rapidly into place, and is secured by a small turning movement. The gun is fired by electricity. In the base of the

cartridge case is screwed an electric primer, against which presses an insulated steel pin, carried in the axis of the breech block. This pin is in communication with the electric wires, which carry the current to fire the primer, only when the breech block is closed, and secured by turning the lever downward against the rear of the block. The circuit is closed and the charge fired by pulling the trigger of a pistol handle arranged in a convenient position close to the sights.

In case of the failure of the electrical firing gear, each gun is also fitted with a percussion lock; the electric primer in the base of the cartridge is replaced by a percussion primer of the same form, and the steel pin, which in the former case supplied the electrical contact, now serves as a firing needle. The percussion firing gear also has a safety appliance to prevent the charge being fired till the breech is

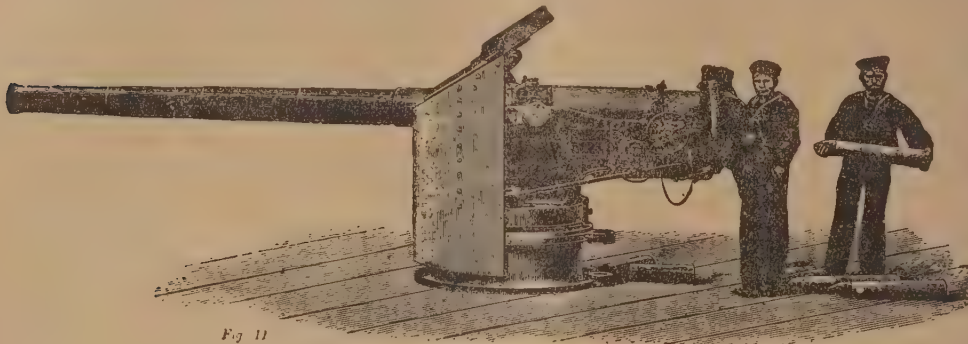


Fig. 11

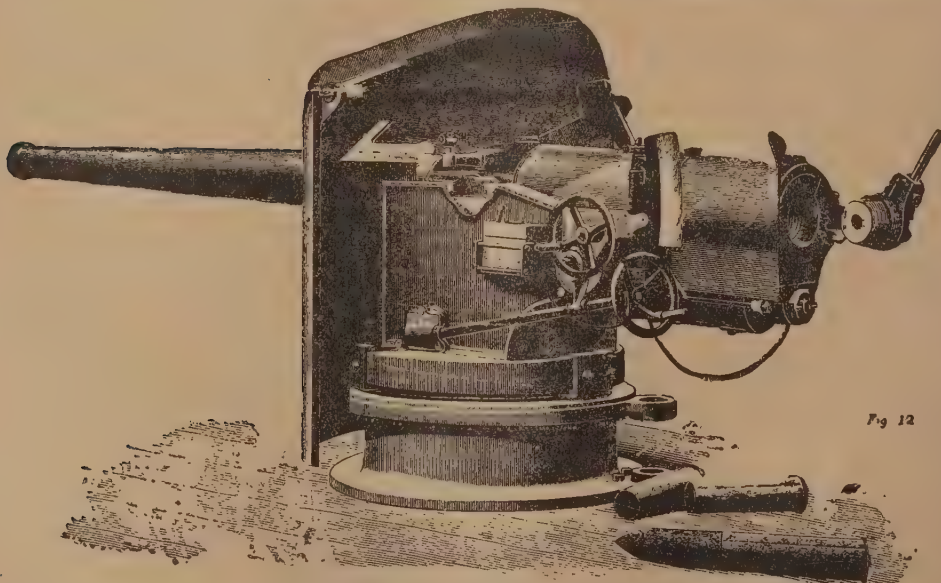


Fig. 12

THE ARMSTRONG 4.7 INCH QUICK-FIRING GUNS.

closed and locked. In this manner all danger of accidental discharge is avoided, and complete security gained. The gun is mounted in a rocking slide, in which it can only move in the direction of recoil. Fixed to this rocking slide is a combined spring and hydraulic buffer arrangement, which serves both to check the recoil and also to run the gun out again after discharge. An arm projects downward from the breech of the gun, and is attached by a nut to the ram of the hydraulic recoil press. The gun itself has no trunnions, but slides in the rocking slide to the extent of the recoil, which is only 9 inches.

The action on firing is as follows: The gun slides back within the rocking slide, the recoil being transmitted by the

arm to the recoil press, where it is absorbed; the spring in the second cylinder is at the same time compressed.

As soon as the recoil is absorbed the spring begins to act, and pushes the gun back along the rocking slide to its first position. The lower part of the mounting is formed by a strong transverse steel plate or transom, which rigidly supports the mounting, and at the same time forms a substantial protection or shield to the base of the structure and the men working behind it. Above this is a lighter steel shield, covering the detachment from rifle fire, the upper portion being arranged to hinge back, so as to admit of a more extended view when using the gun at night.

The under carriage is carried on live rollers running on a

bed-plate, so as to insure great freedom of training, which is effected either by means of a shoulder-piece rigidly connected to the under carriage or by a worm-wheel training gear, worked by a hand-wheel at the sighting or firing position. A clamp on the bed-plate is provided, so as to fix the gun at any desired point of training. The elevation and depression of the gun require very little power, as the gun and working slides are accurately balanced on their trunnion bearings. The rack and pinion gear for this purpose is worked by an elevated hand-wheel close to the training-wheel, and thus also at the sighting or firing position.

This description applies equally to the quick-firing guns and mountings of the larger natures. On account, however, of the increased weight of the ammunition, the carriage and projectile are often handled separately.

The quick-firing gun is an extension, or, at any rate, the outcome of the smaller machine guns of the Hotchkiss, Nordenfiet, and Gardner type. The Hotchkiss are, however, now made up to 3.94 in. bore, and throw a projectile of 33 lb. This class of gun is useful against torpedo boats and unarmored structures, but could hardly be used with effect upon any protection which could be dignified with the name of armor.

The ideal gun has been described as that which possesses high penetrative power, and a capacity for firing shells with the most effective bursting charges, while it could, when required, be fired with great rapidity to repel a flotilla of attacking vessels.

These points are secured with the weapons we are now considering. With the 4.7 in., 5.5 in., and 6 in. guns the projectiles are 45 lb., 70 lb., and 100 lb., or even 120 lb. The rate of fire has been found in actual practice to be from six rounds per minute with the 6-in. gun to fourteen rounds per minute with the 4.7-in. gun. If we compare the rate of fire of these guns with that obtained from the ordinary breech-loading guns in the service, we find that some experiments carried out on shipboard by the admiralty gave ten rounds in 47 seconds from the 4.7-in. quick-firing gun, while the 5-in. ordinary breech-loader took 5 minutes 7 seconds to discharge the same number of rounds.

It is unnecessary to dwell on the advantages of rapidity of fire in action. It was this feature which contributed so much in times past to naval victories.

In this epoch of mechanism, however, we must depend on the brains of our inventors rather than the muscles and nerves of our seamen to give like results; although we by no means wish to say that the day for nerve and muscle is past. Indeed, the value of cool and disciplined courage was never more apparent in the past than it will be in the next great naval war.

Hardly any superiority in *personnel* could compensate for the disadvantage in *material* of a gun requiring over five minutes for what another, though we must have quick-firing guns in spite of minor objections that may be raised against them, such as difficulties on account of smoke—when smokeless powder is not used—or in getting the ammunition to the gun with sufficient rapidity.

Naval authorities have not been slow to acknowledge the advantages of the new principle, and large orders for the navy for 4.7-in. and 6-in. guns have been given to the Messrs. Armstrong, the results of which are very plainly visible just now in the Elswick shops.

We have already described the mechanism of this gun, but there are some points in the design put forward by the makers to which attention may be called. By the interrupted screw system of breech-closing two advantages are secured. First, the action of opening and closing the breech is much simplified, as the breech piece need not be withdrawn before hinging away; and, secondly, the coned shape of the breech screw enables it to take hold, not only of the inner surface of the metal of breech piece or jacket, but also distributes the engagement, and therefore the strain and support, throughout a considerable thickness of the gun.

The breech screw is further arranged so that the threads of the smaller end of the cone correspond longitudinally with the interrupted spaces of the larger end, and *vice versa*, so that the strain and support are also distributed throughout the entire circumference of the breech screw, instead of as formerly, half the circumference being lost by the interrupted spaces. In the mounting the labor of training and elevating is reduced to a minimum. A shoulder crutch and a pistol trigger is provided, and the piece can be handled by a single man with the same ease as the small Hotchkiss 6-pounder.

The recoil is so arranged that the man aiming can alter the position of the gun up to the very instant of firing, and also keep control of the gun working and sighting gear during the actual discharge, or throughout any number of rounds. Naval officers will not be slow to appreciate the advantage secured by this arrangement under the varying conditions of actions at sea.

The carriage allows the gun to recoil always in the line of fire, and the fixings and deck are thus to a large extent relieved of the ordinary recoil strains. After discharge the gun returns instantly and automatically to firing position. A substantial shield of steel, $\frac{3}{4}$ in. thick, is provided in front, and protection is thus given to the men serving the gun.

In the ammunition the principle of the ordinary rifle cartridges has been extended to these guns; the projectile and

powder charge forming only one piece. The powder is put into a solid-drawn brass cartridge, in the mouth of which the projectile is fixed, so that the whole can be handled together. A great saving of time and labor is thus effected, and the incidental advantages of increased safety and the immunity of the powder from climatic deterioration are also secured. To the fact of the projectile and charge being thus placed in the gun at the same time is due the title of "simultaneous loading" which has been applied to these guns. To the improvement in the ammunition the quick rate of firing is very largely to be attributed. The solid-drawn cartridge cases, owing to their great size, have presented difficulties of manufacture; but these have been now surmounted, and it is found in practice these can be fired as many as ten times over without need of re-forming.

In apportioning the ammunition for these guns, penetrating shell will constitute a very large proportion of the whole equipment.

Side by side with the improvement in the guns and mountings have gone new discoveries and developments of gun powder. That specially designed for use in these guns is practically smokeless—an inestimable advantage where rapid firing is an essential—and the hanging smoke which makes good aiming impossible is thus almost entirely avoided. The pressures obtained with it are very uniform, and the velocities very high, ranging up to 2,450 ft. or 2,500 ft. per second.

One of the principal reasons that led to so large an employment of quick-firing guns in naval services was the necessity of being able to cope instantly and effectually with the attack of torpedo boats. The very high rate of speed possessed by the modern torpedo boat, while increasing its powers of offense, has at the same time diminished the risk of its being hit. It not only remains a much shorter time exposed to fire when making its attack, but its rapid motion necessitates a great alteration of aim between each round fired at it, and a corresponding likelihood of error.

Suppose a torpedo boat to be sighted at a distance of 1,500 yards by a war vessel having a broadside armament of three service 5-in. breech-loading guns, each capable of firing two rounds a minute. It is estimated that the torpedo boat could not hope to discharge a torpedo with much certainty at a longer range than 200 yards; and would, therefore, have to traverse a distance of 1,300 yards under fire before she could begin the attack.

Assuming the speed of a first-class torpedo boat to be twenty knots an hour, which is certainly a high figure, the time occupied in traversing 1,300 yards would be, roughly speaking, two minutes. The war vessel, therefore, armed with a broadside of three 5-in. guns, each firing two rounds per minute, would be able to discharge twelve shots at the torpedo boat before there was a chance of her being torpedoed. If, however, in lieu of the three service 5-in. guns she was armed with three of the improved Armstrong 4.7-in. 45 pounders, she could in the same time fire no less than seventy-two shots, each gun being capable of firing twelve shots a minute.

Besides the advantage of being able to fire six times as often, there is the collateral one of a very slight alteration of aim being required in one case and a very considerable one in the other. Between the rounds of the 5-inch breech-loading gun, the torpedo boat would move 340 yards, and the aim would have to be correspondingly altered; while between the rounds of the 45-pounder gun she would only move thirty yards, and a very slight alteration would be required, and a successful shot could thus be instantly repeated.

But although it was the torpedo boat which first gave such an impetus to the introduction of the quick-firing gun, the weapon has been so largely developed in the progress of time that it now holds a much higher position, and cannot fail to play an important part in encounters between important war vessels in the future.

DYNAMITE GUNS.—Concerning the dynamite guns which form the equipment of the fast cruiser *Vesuvius*, we append the following remarks: An official test of these guns was made under the direction of Commodore Goodrich in November, 1889, and the commodore reported that the test was successful beyond anticipation. According to an account in the "Army and Navy Gazette," by one who has been present at the test, these trials have demonstrated that the *Vesuvius* can fire 30 shells—all she can carry—without stopping to fill the air reservoirs. The shells were about 7 feet long, and 10 inches in diameter, holding 200 pounds of explosive gelatine, and weighing respectively 483, 504 and 505 pounds. The performance of these guns as to range and rapidity of flight of the projectiles was nearly twice as great as was demanded by the contract.

The eye-witness concludes by saying, "A vessel that can deliver and explode three tons of high-class dynamite a distance of a mile with any ap-

proach to accuracy is a most formidable agent for attack and defense."

In February, 1893, a new departure was inaugurated by the trials of the Hurst gun, for the construction of which Congress had appropriated \$50,000. The government had also contracted with the inventor, Gen. H. P. Hurst, a Kentuckian, for the purchase of all rights to manufacture and use it in the United States, paying for it \$150,000. Gen. Joseph R. Hawley, of Connecticut, invented, in connection with the gun, a projectile, said to be unique in its efficiency, and has assigned it, free of cost, to the government. The gun is to use what is known as the Hurst reinforced or multicharge cartridge, firing about three times as much powder as is burned in any other gun of equal dimensions. The reinforced charge first burns a third of the powder, and just as the projectile is leaving the arm the remaining charge is exploded, which guarantees safety, insures the minimum recoil and secures the greatest possible velocity.

The velocity for the projectile is said to be of 2,800 feet per second, while the government's guns give the same projectile but 2,150 feet per second. It penetrates twenty-one inches of steel, while the government's guns have but sixteen inches of penetration. It will throw an immense projectile with accuracy from 14 to 18 miles. Ordnance officers declare it the most wonderful invention of the age.

GUNTHER, ALBERT CHARLES, was born at Esslingen (Württemberg), 1830, and educated at the universities of Tübingen, Berlin and Bonn; entered the service of the trustees of the British Museum in 1858, and was appointed keeper of the department of zoology in 1875. Since that time he has devoted himself exclusively to the administration of the extensive collections under his charge. Doctor Gunther is a member of several academies and learned societies at home and abroad. He has published many and valuable works on zoology.

GURNEY, JOSEPH JOHN, born in 1788, of a Quaker family; died in 1847. He devoted his life to the cause of philanthropy, and took a special interest in prison reform, the question so ably advocated by his sister, Mrs. Elizabeth Fry.

GUROWSKI, ADAM, COUNT, born at Kalisz, Poland, Sept. 10, 1805, died at Washington, D. C., May 4, 1866. Expelled from the gymnasium of Warsaw and Kalisz for participating in revolutionary demonstrations, he continued his studies at German Universities. In 1825 he returned to Warsaw, assisted to organize and took part in the unsuccessful revolution of 1830, and at its close escaped to France. In 1835 he published *La Vérité sur La Russie*, which was favorably received by the Russian government, and he was recalled and employed in the civil service. In 1844 he went to Heidelberg, and devoted himself to study; afterwards he lectured in the University of Berne, Switzerland, spent some time in Italy, and in 1849 came to the United States. He was translator in the State Department at Washington from 1861 to 1863. Among his works published in the United States are: *Russia as It Is* (1854); *The Turkish Question* (1854); *A Year of the War* (1855); *America and Europe* (1857); *Slavery in History* (1860); and *My Diary*, notes on the civil war (3 vols., 1862-66).

GUTHRIE, JAMES, born in Nelson county, Ky., Dec. 5, 1792, died in Louisville, March 13, 1869. He was educated at Bardstown, Ky., studied law, and in 1820 commenced practice in Louisville. He was a member of the State legislature from 1827 to 1840, and was president of the convention that framed the present constitution of the State; was secretary of the United States Treasury in 1853-57, and United States Senator in 1865-68.

GUTHRIE, SAMUEL, chemist and inventor, born at Brimfield, Mass., in 1782, died at Sackett's Harbor, N. Y. Oct. 19, 1848. He invented and first manufactured a lock which took the place of the old flint-lock in firearms, and was one of the original discoverers of chloroform. His process of producing chloroform, which he termed "spirituous solution of chloric ether," was tested by the elder Silliman at Yale College in 1831, and a committee of the Medico-chirurgical Society of Edinburgh awarded him the merit of having first published an account of its effects as a diffusible stimulant.

GUTTIFERÆ, or CLUSIACÆ, a natural order of exogenous plants, consisting of trees and shrubs, natives of tropical countries, generally secreting an acrid yellow resinous juice. A few are epiphytes. The leaves are opposite, destitute of stipules, leathery and entire. This order is allied to *Hypericinae*. It contains about 150 known species, the greater part of them South American. The resinous secretions of some are valuable, and a few species afford valuable timber. The flowers of some are very fragrant; those of *Messua ferrea* are found in a dried state in every bazaar in India, and used as a perfume. The fruit of some is very highly esteemed.

GUYOT, ARNOLD, geographer, born in Switzerland in 1807, died at Princeton, N. J., Feb. 8, 1884. He took the degree of Ph. D. at Berlin in 1835; was the colleague of Agassiz at Neuchâtel in 1839-48, and in the latter year accompanied him to America. He delivered a course of lectures at Lowell Institute, Cambridge, which were translated and published as *Earth and Man*, in 1853; in 1854 was appointed professor of physical geography and geology at Princeton, which position he occupied until his death, being for some time senior professor. He had the management of the meteorological department of the Smithsonian Institution, where he delivered several courses of lectures, and in connection with which he published *Meteorological and Physical Tables* (revised ed., 1884). His other works include: *A Treatise on Physical Geography* (1873); *Creation, or the Biblical Cosmogony in the Light of Modern Science* (1884); and a number of valuable biographical memoirs.

GUYSBOROUGH, a seaport town, capital of Guysborough county, N. S., situated near the head of Chedabucto Bay, about 120 miles east-northeast of Halifax. It has a commodious harbor, and important industries of fishing and gold-mining. It is also the seat of a large academy.

GUY'S HOSPITAL, London, England, was founded by Thomas Guy (see *Britannica*, Vol. XI, p. 341), who leased from the governors of St. Thomas's hospital, a large piece of ground for a term of 999 years, at a ground-rent of £30 a year. The hospital admitted its first patient in 1725, a few days after the death of its founder. In 1829 Mr. Hunt bequeathed to the hospital £190,000, and additional bequests to the amount of £10,000 have since been received. There was at first room for about 400 patients; now 700 can be accommodated. The yearly average of patients is over 5,000; the out-patients relieved may amount to above 80,000. The annual income is about £40,000. Students enter the hospital for study, attending clinical practice, lectures, etc., and paying annual fees. A library and valuable museums are attached to the hospital. New wards, with tall towers for ventilation, were built in 1852, and a chemical laboratory in 1872. A dental school for complete instruction in dental surgery and mechanics and a residential college for the accommodation of fifty students and the junior medical staff have recently been added. In the chapel is a fine marble statue of Guy, by Bacon,

which cost \$5,000. Sir Astley Cooper, the eminent surgeon, is buried in the chapel.

GUZMAN-BLANCO, ANTONIO, born in Caracas in 1830, was banished for his share in political disturbances, and, after taking a prominent part in two invasions, became vice-president of Venezuela in 1863. Driven from office in 1868, he headed a revolution which restored him to power in 1870, and for many years he was virtual dictator of the country, though not continuously occupying the position of president. In 1889, however, popular discontent was aggravated by reports of corrupt contracts made in Paris; and Blanco, who was then acting as envoy to all the European powers, was practically deposed by Congress, which refused to accept the resignation of his former *protégé* and present rival, Dr. Rojas Paul.

GWIN, WILLIAM MCKENDREE, born in Sumner county, Tenn., Oct. 9, 1805, died in New York City, Sept. 3, 1885. He received a classical education, took his degree of M. D. in 1828 at Transylvania University, and removing to Clinton, Miss., obtained an extensive practice. He was appointed United States Marshal for the district of Mississippi in 1833, and in 1840 he was elected to Congress as a Democrat. In 1849 he removed to California, where he took an active part in favor of the formation of a State government. He was elected United States Senator for the long term; was reelected, and served till March 3, 1861. In 1863 he went to Paris, and becoming interested in a scheme to colonize Sonora, Mexico, with Southerners, spent the two following years in an unsuccessful attempt to carry out his plan. He afterwards returned to his home in California, and continued to take an active part in politics.

GWINNETT, BUTTON, born in England about 1732, died in Georgia, May 27, 1777. He received a good education, was for a time engaged in mercantile pursuits in Bristol, England; emigrated to Charleston, S. C., and in 1770 purchased a plantation on St. Catherine's Island, Ga., and engaged in agriculture. He took an active part in the political questions of 1776, was elected a representative to the General Congress in 1776, and signed the Declaration of Independence. He was reelected for the ensuing year, was appointed a member of the State government, and president of the provincial council. His death resulted from a duel with Gen. McIntosh, fought May 15, 1777.

GYMNASTICS, a term applied to those exercises not amounting in intricacy to games, by which particular limbs, either singly or in combination, are rendered more pliant or stronger. These exercises are arranged in a due progression, and the entire series becomes a system under the name gymnastics. Gymnasias now exist in most European countries, and are popular in the Northern United States.

Gymnastic exercises may be divided into two great groups, those conducted without and those conducted with apparatus, while the latter group may be again subdivided into those requiring movable apparatus and those requiring immovable apparatus—*i. e.*, so far as the gymnast is concerned.

Exercises without apparatus have been specially studied in Sweden, and there chiefly by Professor Ling. By various movements of the arms, trunk, and lower limbs, singly or combined, every muscle

in the body can be brought into play, and all that is required for keeping the body in health can thus easily be practiced. In schools these movements have often been carried out with great advantage between lessons, giving the children that exercise which their growing frames demand, and thus avoiding restlessness, which is the natural result of enforced quiet. When a number of children work together, and especially when in time to music, the interest of the practice is greatly increased.

Next in simplicity are gymnastic exercises with movable apparatus—*i. e.*, such as weights and bars. Of these, the commonest forms are dumb-bells, barbells and Indian clubs. The arms and shoulders can be made to do any amount of work with these, according to the weights employed, and, if so desired, many of the exercises of the first group designed for the trunk and lower limbs may be carried out while dumb-bells or bar-bells are held in the hands, thus materially increasing the work done.

The forms of apparatus required for the last group of exercises are numerous, but only a few are really essential. Thus we have any number and variety of exercises that only require the horizontal and parallel bars, though in most gymnasia there are, besides, iron rings hung by ropes from the roof, a trapeze-bar also hung from the roof, ladders horizontal at some distance above the floor and vertical, climbing poles and ropes, and various pulleys with weights attached for exercising the wrists and shoulders.

GYMNOCLADUS, a genus of trees of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*. *G. Canadensis* is a North American tree, found both in Canada and over a great part of the United States, attaining a length of fifty to sixty feet, with upright branches and a rough bark. The leaves of young trees are very large, three feet long, bipinnate, and armed with thorns. The flowers are white, in short spikes, the pods five inches long by two broad. It is sometimes called the *Kentucky Coffee-tree*, because the seeds were formerly roasted and ground as coffee in Kentucky. It grows well in Britain. The wood is used both by cabinet-makers and by carpenters. It has very little sap-wood. The pods, preserved like those of the tamarind, are said to be wholesome and slightly aperient.

GYMNODONTES, a group of plectognath fishes, distinguished by having teeth united into an ivory-like substance resembling a beak. The different species are eccentric in form; most of them can distend themselves into a more or less globular shape. Some are covered with spines or prickles, and in others the body is truncated behind. The group contains several families, as *Tetrodontideæ*, *Diodontideæ*, *Molidæ*, etc.

GYMNOGENS, Lindley's term, now obsolete, for the Gymnosperms.

GYPSUM. See Britannica, Vol. XI, p. 351.

GYPSY-WORT (*Lycopus Europæus*), sometimes also called water horehound, a perennial plant of the natural order *Labiataæ*. It is a tall erect branching plant, slightly hairy, with a creeping root-stock. It is found in Britain, on the Continent, in Russian and Central Asia, and North America, and is regarded as a febrifuge and stringent. It dyes a permanent black. The bugle-weed of North America (*L. virginicus*) has more powerfully astringent properties.

H

HABBERTON—HÆMATEMESIS

HABBERTON, JOHN, was born in Brooklyn in 1842. From 1859 until he entered the army in 1862 he was connected with the publishing house of Harper Brothers. He was literary editor of the *Christian Union* from 1873 to 1876, and since then has been an editorial writer on the *New York Herald*. His first literary work was a series of sketches of Western life. This was followed by a volume of *Selections from the Spectator*, 1876, and in the same year appeared *Helen's Babies*, of which nearly a quarter of a million copies have been sold in the United States. He has since written *The Barton Experiment*, 1876; *The Jericho Road*, 1877; *Other People's Children*, 1877; *The Scripture Club of Valley Rest*, 1877; *Some Folks*, 1877; *The Crew of the Sam Weller*, 1878; *Little Guzzy*, 1878; *The Worst Boy in Town*, 1879; *Just One Day*, 1880; *Who Was Paul Grayson?* 1880; *Bowsham Puzzle*, 1884; *George Washington*, 1884; and *Couldn't Say No*, 1890.

HACKENSACK, a railroad center and the county-seat of Bergen county, N. J., located on the Hackensack River, 13 miles from New York. It has numerous factories. Pop. (1890), 6,004.

HACKETT, HORATIO BALCH, born in Salisbury, Mass., December 27, 1808; graduated at Amherst in 1830, and studied in Germany. He became a tutor at Amherst, professor of ancient languages at Brown University, and in 1839 professor of Biblical literature in Newton Theological Institute, which last position he held until 1869. In 1870 he became professor of Greek in Rochester Theological Seminary, and died November 2, 1875. He was one of the American revisers of the Bible, and was the author of many important works.

HACKETTSTOWN, a railroad junction of Warren county, N. J., situated on the Musconetcong River. It contains the Newark M. E. Conference Seminary, a car manufactory, foundries and several carriage manufactories. Pop. (1890), 2,417.

HACKLÄNDER, FRIEDRICH WILHELM, VON, German novelist and comedy writer, born at Burtscheid, near Aix-la-Chapelle, Nov. 1, 1816, died at Munich, July 6, 1877. He commenced his literary career with the publication of *Bilder aus dem Soldatenleben* (1841), and three years later followed up his success with *Das Soldatenleben im Frieden* (9th ed., 1883). He accompanied Baron von Taubenheim on his travels to the East, and in 1843 was appointed private secretary to the crown-prince of Württemberg, with whom he traveled in the succeeding years. In March, 1849, he went to Italy, and was present with Radetzky's army during the campaign in Piedmont. From 1859 he lived chiefly in Stuttgart. The best of his longer novels are *Handel und Wandel* (1850); *Eugen Stillefried* (1852); and *Namenlose Geschichten* (1851). His best comedies are the *Geheimer Agent* (1850), which has been performed throughout Germany, and translated into several European languages.

HADDAM, one of the county-seats of Middlesex county, Conn., on the west bank of the Connecticut River. It has large granite quarries. Pop. (1890), 2,065.

HADDON HALL, an old English baronial mansion, the seat successively of Avenells, Vernons, and the Rutland family. It stands on a slope

overlooking the Wye in Derbyshire, 23 miles north-northwest of Derby. The styles of architecture range from Norman to the 16th century. Reference is made to it in Scott's *Peveril of the Peak*.

HADES, the Greek name for the under-world. See *Britannica*, Vols. VIII, p. 536; XX, p. 114; XIV, p. 646.

HADROSAURUS, the name given to a very large Dinosaurian of the cretaceous epoch, whose remains have been found in the United States.

HAECKEL, ERNST HEINRICH, a German naturalist, born at Potsdam, Feb. 16, 1834. He studied natural science and medicine at Würzburg, Berlin, and Vienna, and soon became distinguished for his enthusiasm and originality in zoological studies. After working for a time at Naples and Messina, he became a privatdocent in the University of Jena in 1861, a professor *extraordinarius* in 1862, and an ordinary professor of zoology in 1865. In this position he has remained, working indefatigably in his zoological institute, and by his lectures rendering the University a very famous school for biological science. Haeckel has devoted his life to applying the doctrine of evolution, and has brought forward many interesting facts in support of the theory. The most important of his numerous systematic works are: *Die Radiolarien* (1862); *Die Kalkschwämme* (1872); *System der Medusen* (1879); and his contributions to the *Challenger Reports on Deep-Sea Medusæ* (1882); *Siphonophora* (1888); and *Radiolaria* (1887).

HAGEN, HERMANN AUGUST, born in Prussia, May 13, 1817; graduated at Königsburg, and practiced medicine. In 1867 he came to Cambridge, Mass., as assistant to Prof. Louis Agassiz, and in 1870 became professor of entomology at Harvard. He has written many articles on his favorite study, and is a fellow of the American Association for the Advancement of Science.

HÄHNEL, ERNST JULIUS, a German sculptor, born at Dresden in 1811. He studied architecture, but in 1830 he went to Munich and became a sculptor. Being recalled to his native city, in 1838, he made many sculptures for the new theater there. Among these are the statues of Sophocles, Aristophanes, Molière, and Shakespeare, and a bas-relief of Bacchus. Afterwards he prepared a statue of Beethoven, now in Bonn; a statue of Charles V., for the University in Prague; and for the new museum at Dresden he made six statues: Alexander the Great, Lysippus, Michel Angelo, Dante, Raphael, and Peter von Cornelius. After 1858 he made statues of the four Evangelists for the cathedral tower in Dresden; an equestrian statue of Prince Schwartzenberg for Vienna; a bronze statue of Leibnitz for Leipzig; and many other statues for his native city. Hähnel has been a member of the academy at Dresden since 1842, and a professor since 1848.

HÆMATEMESIS (Gr. *haima*, "blood," and *eme-sis*, "vomiting"), the ejection of blood from the stomach by vomiting. Its most common causes are gastric ulcer, congestion of the stomach or the neighboring portions of the alimentary canal, and certain conditions of the blood, as in yellow fever, purpura, and sometimes in typhus.

HÆMATOZOA (Gr. *haima* "blood," and *zōon*, an "animal"), parasites occurring in the blood. See PARASITISM, Britannica, Vol. XVIII, pp. 258-71.

HÆMODORACEÆ, an order of monocotyledons, consisting of herbaceous plants with fibrous roots and sword-shaped leaves, differing from *Iridacæ* in habit, and in having the stamens six in number, or, if only three, opposite to the petals. There are about 50 known species, chiefly natives of America, South Africa and Australia.

HAGARTY, HON. JOHN HAWKINS, D.C.L., chief justice of the supreme court of Ontario, was born at Dublin, 1816. He entered Trinity College in 1832, but two years afterward emigrated to Canada, where, in 1840, he was admitted to the bar. He was made a queen's counsel in 1850, and elevated to the bench in 1856. In 1868 he was appointed chief justice of the common pleas, and in 1878 received the appointment of chief justice of Ontario.

HAGEN, HERMANN AUGUST, a Prussian entomologist, born in 1817. In 1840 he received a medical degree from the University at Königsberg, and later studied in Paris, Berlin and Vienna. He devoted much attention to entomology, and in 1834 published a paper on *Prussian Odontata*. For some time from 1843 he practiced medicine at Königsberg, and for three years was the first assistant at the surgical hospital. From 1863 to 1867 he was vice-president of the city council. In 1870 he was made professor of entomology at Harvard University, Cambridge, Mass. He has written upwards of four hundred articles on scientific subjects.

HAGERSTOWN, a city and the county-seat of Washington county, Md. It lies in the fertile Cumberland valley, 86 miles west of Baltimore. It is the terminus of the Shenandoah Valley Railroad and of a branch of the Baltimore and Ohio system. The Cumberland Valley Railroad and the Western Maryland Railroad run through the town. Hagerstown has a fine court-house, a jail, and an academy of music; also a free library, public water works, banks, hotels, churches, seminaries and public schools. Several newspapers are published here. This town is a local center of high social refinement, the population being mostly of American birth, many of German descent. The chief manufactures are furniture, wheels, doors, sashes, castings, farm tools, brooms, cigars and fertilizers. Population in 1890, 11,698. See Britannica, Vol. XI, p. 370.

HAGGAI. See Britannica, Vol. XI, p. 870; Vol. XIII, p. 418.

HAGGARD, HENRY RIDER, English novelist, born at Bradenham Hall, Norfolk, June 22, 1856, and educated at Ipswich Grammar School. At the age of nineteen he accompanied Sir Henry Bulwer to Natal as his private secretary, and subsequently served in a similar capacity under Sir Theophilus Shepstone, commissioner to the Transvaal. On his return to England he settled down to a literary life. He published *Ceterways* and *His White Neighbors* (1882); *Dawn* (1884); and *The Witch's Head* (1885). The publication of *King Solomon's Mines* (1886) won for him great popularity, which was further increased by the appearance of *She* in 1887. *Jess*, *Allan Quartermain*, *Maiwa's Revenge*, *Mr. Meeson's Will*, *Cleopatra*, *Allan's Wife*, and *Eric Brighteyes*, are among Mr. Haggard's recent writings.

HAGUE, ARNOLD, geologist, was born in Boston, 1840; graduated at the scientific school of Yale in 1863, and for several years studied at Göttingen, Heidelberg, and Freiberg. In 1867 he was appointed assistant on the United States geological exploration, under Clarence King. From 1867 to 1868 he was in California. He contributed a number of

papers to the United States Government reports. In 1877 he became government geologist of Guatemala. In 1878 the Chinese government employed him to examine the mines in northern China. In 1879 he returned to the United States and became one of the geologists of the government survey. In 1883 he became geologist of the Yellowstone Park division.

HAIMURA (*Erythrinus macrodon*), a large freshwater fish of Guiana. It measures from $3\frac{1}{2}$ to 4 feet in length; its flesh is well flavored, and at times it forms the principal article of food with the Indians. It is very voracious. The jaws are powerful, and the teeth are large and can inflict serious wounds.

HAIR GRASS (*Aira*), a genus of grasses having delicately paniced inflorescences, bearing spikelets with two unequal glumes and two perfect flowers, each with two thin membranous bracts, of which the outer is generally awned. The species are natives of temperate and cold climates. Five species are natives of Britain, and are chiefly found in situations where the soil is unfertile. The tufted hair-grass, or tufted grass (*A. caespitosa*), common in better pastures and meadows, is a beautiful grass when in flower. It attains a height of 2 to 4 feet, and is sometimes used for thatching ricks of hay or corn. It grows luxuriantly in moist situations, and indicates a badly drained soil. This grass is sometimes sown to form cover for game, particularly hares.

HAIR-POWDER, a pure white powder made from pulverized starch, scented with violet or some other perfume, and in the 17th and 18th centuries largely used in England for powdering over the head. The fashion became universal among the higher and middle classes, with ladies as well as gentlemen. To make the powder hold, the hair was usually greased with pomade, and accordingly the fashion was extremely troublesome. An act of Parliament fixed that the powder should be made from starch alone, and on November 20, 1746, fifty-one barbers were fined £20 each for keeping hair-powder not made from starch. In 1795 a tax was put on hair-powder, and it was not repealed until 1869. At the time of its abolition it was paid by about 800 persons, and yielded a revenue of about £1,000 a year.

HAIR-TAIL, a long thin sea-fish. See Britannica, Vol. XI, p. 877.

HALDEMAN, SAMUEL STEHMAN (1812-80), an American naturalist. From 1837 to 1842 he was engaged on the Pennsylvania geological survey, and during that time prepared five annual reports. In 1842-43 he was engaged in delivering lectures on zoölogy at the Franklin Institute in Philadelphia, and in 1851 was made professor of natural sciences in the University of Pennsylvania. In 1855 he became professor in Delaware College. From 1869 to his death he was professor of comparative philology in the University of Pennsylvania. Besides many articles on philology, conchology, entomology, geology, chemistry, and palæontology, he published *Fresh-Water Univalve Mollusca of the United States* (1840); *Zoölogical Contributions* (1842); *Elements of Latin Pronunciation* (1851); *Tours of a Chess Knight* (1865); *Afices in their Origin and Application* (1865); *Rhymes of the Poets* (1868); *Pennsylvania Dutch* (1872); *Outlines of Etymology* (1877); and *Word-Building* (1881).

HALE, BENJAMIN (1797-1863), an American educator. In 1822 he was licensed to preach as a Congregationalist, and in 1823 became tutor in Bowdoin, but subsequently became principal of the Gardiner Lyceum. From 1827 to 1835 he was professor of chemistry and mineralogy at Dartmouth:

from 1836 to 1858 he was president of Hobart College, Geneva, N. Y., resigning in the latter year on account of feeble health. He wrote *Introduction to the Mechanical Principles of Carpentry* (1827); and *Scriptural Illustrations of the Liturgy* (1835).

HALE, EDWARD EVERETT, an American author and Unitarian divine, born in 1822. He was licensed to preach in 1842; from 1846 to 1856 was pastor of the Church of the Unity in Worcester, Mass., whence he was called to the South Congregational (Unitarian) church in Boston. He has been a constant contributor to periodical literature, and has edited the Boston "Daily Advertiser," the "Sunday-School Gazette," the "Christian Advertiser," the "Old and New," and the "Lend a Hand;" a *Record of Progress and Journal of Organized Charity*. Besides numerous other writings he has published *The Rosary* (1848); *Margaret Percival in America* (1850); *Sketches of Christian History* (1850); *Letters on Irish Emigration* (1852); *If, Yes, and Perhaps* (1868); *Ten Times One is Ten* (1870); *Our New Crusade* (1875); and *The Kingdom of God* (1880).

HALE, EUGENE, a United States Senator, born in 1836. He was admitted to the bar in 1857; was for nine successive years county attorney for Hancock county, Maine; was a member of the State legislature in 1867, 1868 and 1880; and was a member of the 41st, 42d, 43d, 44th and 45th Congresses. He was elected to the United States Senate as a Republican; took his seat March 4, 1881, and was reelected in 1887 and 1893. His term of service will expire March 3, 1899.

HALE, JOHN PARKER (1806-73), an American statesman. He was admitted to the bar in 1830, and in 1832 was elected to the New Hampshire legislature. From 1834 to 1841 he was United States district attorney, and from 1843 to 1845 was a member of Congress. In 1847 and again in 1855 he was United States Senator, and in 1865 was minister to Spain. In 1852 he was the Free-soil party's candidate for President, and received 157,685 votes.

HALE, NATHAN (1755-76), an American soldier. He graduated at Yale in 1773, and then taught school in East Haddam, and later in New London, Conn. At the beginning of the Revolutionary war he enlisted as a volunteer, and became a lieutenant in Col. Charles Webb's regiment. In January, 1776, he was made a captain, and a little later held a similar post in a company in the "Connecticut Rangers." On Gen. Washington's call for a volunteer to enter the British lines and procure intelligence Capt. Hale responded, and disguised as a schoolmaster and loyalist, he visited all the British camps in New York and on Long Island. He obtained the needed information, but when about to return he was arrested and condemned to be executed before sunrise on the next morning. The execution took place in Col. Henry Rutgers' orchard, near the junction of East Broadway and Market Street, New York city. Capt. Hale's last words were: "I only regret that I have but one life to lose for my country."

HALE, NATHAN (1784-1863), an American journalist. He was admitted to the Connecticut bar in 1810, and in 1814 became an editor of the "Boston Weekly Messenger." The same year he purchased the "Boston Daily Advertiser," and continued as its chief editor until his death. He was a founder of the "North American Review" in 1815, and of the "Christian Examiner" in 1828, and in 1840 he edited and published the "Monthly Chronicle." For nineteen years he was president of the Boston and Worcester Railroad, and in 1846 was chairman of the commission for introducing water into the city. He was at various times

a member of the legislature, and held important offices in various literary organizations. He published *Journal of Debates and Proceedings in the Massachusetts Constitutional Convention* (1821), besides numerous pamphlets on public improvements.

HALE, SARAH JOSEPHA (BUELL) (1788-1879), an American authoress. From 1823 to 1837 she edited the Boston "Ladies' Magazine," and when this periodical was united with "Godey's Lady's Book," published in Philadelphia, she became editor of this magazine. In 1877 she retired from editorial work. Mrs. Hale was the author of *Woman's Record, or Sketches of All Distinguished Women from the Creation to the Present Day* (1853); *Northwood* (1827); *Sketches of American Character* (1830), and a number of other useful and entertaining works in prose and verse. Among her fugitive pieces *Mary's Lamb* is one of the most widely known. Her exertions in behalf of the Bunker Hill Monument Fund, her interest in seamen, in foreign missions, and in the higher education of women were untiring and effective. For more than twenty years she advocated the keeping of Thanksgiving Day as a national festival, to be held on the same day throughout the country, as it has been observed since 1864.

HALES, JOHN, M. A., "the Ever-memorable," English divine and critic, born at Bath, April 19, 1584, died at Eton, May 19, 1656. At the age of thirteen he entered Corpus Christi College, Oxford, obtained a fellowship at Merton College in 1605, and in 1612 became professor of Greek in his University. In 1618 he went to the Hague as chaplain to the ambassador, Sir Dudley Carleton, for whom he made a report of the proceedings at the famous Synod of Dort. He was there converted to Arminianism, and was subsequently appointed to a canonry at Windsor. The Puritan supremacy deprived him of this office and reduced him to poverty. Hales was one of the oldest of what is now called the Broad Church school—a rare example of a profound student without pedantry, a ripe theologian with an altogether untheological clearness of mind and directness of phrase. His writings were collected and published as the *Golden Remains of the Ever-memorable Mr. John Hales, of Eton College* (1659).

HALEVY, JOSEPH, a French orientalist, born at Adrianople, Turkey, in 1827. He studied the Semitic languages, and afterwards taught Hebrew in Adrianople and Bucharest. He became widely known through his Hebrew poems. The *Alliance Israélite Universelle* commissioned him in 1868 to examine the condition of the Fallashas of Abyssinia, which he did. His report attracted much attention. In 1869 the French government sent him to the southwestern part of Arabia, called Yemen (Arabia Felix of the Romans), to explore it archaeologically. Here he deciphered 68 inscriptions. He has published several volumes on oriental antiquities and epigraphy.

HALEVY, LÉON, a French poet and dramatist of Jewish extraction, born at Paris, in 1802, died at St. Germain-en-Laye, Sept. 3, 1883. He was educated at the Charlemagne Lyceum, where he became a proficient Greek scholar. Afterward he was a follower of Saint-Simon; assisted the latter in founding "Le Producteur;" issued the *Poésies Européennes*; wrote a *Résumé de l'Histoire des Juifs*; and in 1838 the *Histoire Résumée de la Littérature Française*. From 1838 to 1853 he was employed in the bureau of historic monuments in the department of public instruction. In 1855 he published the *Fables Nouvelles*, and in 1861 finished *La Grèce Tragique*. Besides, he published numerous poems, novels, tales, and translations from ancient and modern languages. His dramatic works cover a wide field. They in-

clude the tragedies *Le Czar Demetrius*, and *Electra*, the comedy *Le Duel*, and many dramas.

HALÉVY, LUDOVIC, born at Paris, Jan. 1, 1834, and in 1861 became secretary to the Corps Législatif. He first became known as the writer of the librettos to Offenbach's burlesques: *Orphée aux Enfers* (1861); *La Belle Hélène* (1865); *La Vie Parisienne* (1866); *La Grande-duchesse de Gérolstein* (1867); *Les Brigands* (1870). He wrote, besides, a large number of vaudevilles and comedies, among them *La Pêchole* (1868); *Frou-frou* (1869); *Tricouche et Cacolet* (1872); *La Petite Mère* (1880). His *Madame et Monsieur Cardinal* (1873) and *Les Petits Cardinals* (1880) are humorous sketches of Parisian theatrical life. In 1882 he published the charming idyllic story, *L'Abbe Constantine*, which was followed by *Criquette* and *Deux Mariages* in 1883. Halévy was admitted to the Academy in 1886. In many of his plays he had the collaboration of H. Meilhac.

HALF-BLOOD, related through one parent only. When two persons have the same father, but not the same mother, they are called brothers or sisters consanguinean; when they have the same mother only, they are called brothers and sisters uterine.

HALFORD, SIR HENRY, an English physician, born at Leicester, Oct. 2, 1766, died in London, March 9, 1844. He was educated at Rugby and Oxford, took his degree of M. D. in 1791, and three years later settled in London, where he became very popular. He was made a baronet in 1809, and was court-physician throughout the greater part of his career. Author of *Essays and Orations* (1831); *The Death of Some Eminent Persons* (1835); and *Nugæ Metricæ* (1842).

HALF-PAY, an allowance given in the British army and navy to commissioned officers who are not actively employed, and corresponds to the French *demi-soldé*. In the navy officers are appointed to a ship to serve for the period during which she is in commission. At the end of that period, or if promoted or otherwise removed from her, they are placed on half-pay until again called upon to serve. In the army permanent half-pay, first granted in 1698, was abolished in 1884, retired pay being substituted for it. Under the provisions of the royal warrant of 1887 lieutenant-colonels who have held command for four years are placed on temporary half-pay (11 s. a day) until promoted. Majors of seven years' regimental or five years' staff service in that rank may claim promotion to half-pay lieutenant-colonels; and these or any officers of lower rank may be placed on the half-pay of their rank while incapacitated through illness, or as a punishment for inefficiency. Seconded officers are those who are extra-regimentally employed, but whose names remain on the rolls of their regiments, additional officers being appointed in their places. On the termination of such employment they are absorbed into the regiment as soon as vacancies occur in their proper rank. Officers on retired pay are liable to be called upon to serve in case of national peril or great emergency.

HALL, ASAPH, an American astronomer, born in 1829. From 1857 to 1862 he was assistant in the Observatory of Harvard University, and then became aid in the United States Naval Observatory in Washington. He has been connected with all the important astronomical expeditions sent out under the United States Government since 1863, and has won great distinction by his discovery of the moons of Mars, which he named Deimos and Phobos (Terror and Fear). Prof. Hall is a member of numerous scientific societies, both in this country and in Europe.

HALL, DARWIN S., an American Congressman, born in 1844. In 1866 he settled in Minnesota, and

in 1869 and 1871 was elected county auditor of Renville county. He edited the Renville "Times" for several years, and was clerk of the district court in 1873 and 1877. In 1876 he was elected to the legislature; was appointed register of the United States land office at Benson in 1878 and 1882, and was chosen to the State Senate in 1886 for a term of four years. He was elected to the 51st Congress as a Republican.

HALL, DOMINIC AUGUSTINE (1765-1820), an American jurist. He was district judge of Orleans Territory from 1809 to 1812, and, when Louisiana was admitted to the Union, became one of its United States judges. He remained in the United States court until his death.

HALL, JAMES, an American palæontologist, born in 1811. From 1832 to 1836 he was assistant professor of chemistry and natural sciences at the Rensselaer polytechnic institute, and then became professor of geology. In the same year he was appointed assistant geologist of the geological survey of New York, and in 1837 was made State geologist in charge of the fourth district. He made his full report on the survey in 1843, and was then placed in charge of the palæontological work. In 1855 he was State geologist of Iowa, and in 1857 of Wisconsin. In 1866 he was appointed director of the New York State museum, still retaining the office of State geologist. He has written numerous important reports on geological and palæontological subjects.

HALL, JOHN, an Irish-American Presbyterian clergyman, born in 1829. He was licensed to preach in 1849, and engaged in missionary labor in the west of Ireland. In 1852 he became pastor of the First Presbyterian church at Armagh, and in 1858 of St. Mary's, Dublin. In 1867 he visited the United States as a delegate from the general assembly of the Presbyterian church in Ireland to the Presbyterian churches in the United States, and the same year was summoned to take charge of the Fifth Avenue Presbyterian church in New York. For several years he was chancellor of the University of the City of New York, resigning in 1891 because of the pressure of other duties. He is the author of *Family Prayers for Four Weeks* (1868); *Papers for Home Reading* (1871); *Familiar Talk to Boys* (1873); *Questions of the Day* (1873); *Foundation Stone for Young Builders* (1880); and *A Christian Home; How to Make and How to Maintain It* (1883).

HALL, LYMAN (1725-90), a Signer of the Declaration of Independence. In 1752 he settled in Sunbury, Ga., and acquired a large medical practice. He was a member of Congress from 1775 to 1780, and governor of Georgia in 1783. He was a member of the pre-Revolutionary conventions held in Savannah in 1774 and 1775.

HALL, NEWMAN, an English clergyman, born in 1816. From 1842 to 1854 he was pastor of the Albion Congregational church in Hull, and then went to London to take charge of Surrey Chapel, Blackfriars' road. In 1867 and again in 1873 he visited the United States, lecturing in the principal cities. Dr. Hall's publications include: *The Christian Philosopher* (1849); *Italy, the Land of the Forum and the Vatican* (1853); *Lectures in America* (1868); *Sermons and History of Surrey Chapel* (1868); *From Liverpool to St. Louis* (1869); *Prayer, its Reasonableness and Efficacy* (1875); *The Lord's Prayer* (1883); and *Songs of Earth and Heaven* (1885).

HALL, SAMUEL CARTER, author and editor, born at Geneva Barracks, County Waterford, Ireland, May 9, 1800, died March 16, 1889. In 1822 he went to London, studied law, and became a reporter for the "New Times." In 1825 he established the "Amulet," which he edited for several years; afterwards succeeded the poet Campbell as editor of the

"New Monthly Magazine," and did other journalistic work before founding the "Art Journal," which he edited from 1839 till 1880. He was an industrious worker and skillful compiler, the joint works written and edited by Mr. and Mrs. S. C. Hall exceeding 500 volumes. Among these were: *Ireland* (1841-43); *The Book of Gems; British Ballads*, one of the fine-art books of the century; and *Baronial Halls*. In 1880 he received a civil-list pension of £150 a year.

HALL, S. C., MRS. (ANNA MARIA FIELDING,) an Irish author, born in Dublin Jan. 6, 1805, died Jan. 31, 1881. At fifteen years of age she went to London, where her education was completed, and in 1824 married Samuel Carter Hall, whom she assisted in many of his works. She established a reputation of her own by her *Sketches of Irish Character* (1828); *Uncle Horace* (1837); *Lights and Shadows of Irish Character* (1838); *Marian* (1839); *Midsummer Eve* (1843); *The Whiteboy* (1845); and numerous shorter stories. She also contributed to the "Art Journal" and other periodicals, edited the "St. James's Magazine" for a year, and wrote various books for the young. She assisted in the formation of the Governesses' Benevolent Institution, and the Nightingale fund, the latter resulting in the endowment of a training-school for nurses.

HALL, SIR JOHN B., K. C. M. G., a New Zealand statesman, a member of Parliament since 1856 and premier, 1878-82. He was a member of the Federal conference held in Melbourne, Australia, in Feb., 1880.

HALLAMSHIRE, an ancient manor of the West Riding of Yorkshire, with Sheffield for its capital. It now gives name to a parliamentary division.

HALLÉ, SIR CHARLES, pianist, born in 1819, near Elberfeld, Germany. He studied chiefly in Paris. The revolution of 1848 drove him to London, where he soon came prominently into notice. He subsequently settled in Manchester as a classical pianist. Hallé has edited *Classical Composers*, and has done much for the culture of a high description of music. He was knighted in 1888.

HALLIWELL-PHILLIPPS, JAMES ORCHARD, F. R. S., an English antiquary and philologist, born at Chelsea in 1820, died at Brighton, Jan. 3, 1889. He studied for a time at Cambridge, and in 1839 began his long career as editor and publisher of old English authors and manuscript texts. His earlier work embraced plays, ballads, popular rhymes and folklore, chap-books, and English dialects, but he gradually came to concentrate himself upon Shakespeare alone. In 1872 he succeeded to the property of Thomas Phillipp. This wealth he made use of in the accumulation of an unrivaled collection of Shakespearean books, manuscripts, and rarities of every kind, in the entertainment of scholarly visitors, and in gifts of valuable books to Edinburgh University, Stratford, and Birmingham.

HALPINE, CHARLES GRAHAM (Miles O'Reilly), was born in Ireland, 1829, and died in New York, 1868. He graduated at Trinity College, Dublin, in 1846; married young and engaged in journalism. In 1852 he came to New York. At the beginning of the civil war he enlisted in a New York regiment; was immediately promoted lieutenant, and afterward served on Hunter's staff with the rank of major. While acting in this capacity he wrote the series of articles purporting to be the production of one "Private O'Reilly." He served on General Halleck's staff, and with Hunter in the Shenandoah Valley, and received the brevet of brigadier-general of volunteers.

HALLOWELL, a city of Kennebec county, Me., on the west bank of Kennebec River, two miles

south of Augusta. Cotton goods, oil-cloth, carriages, soap and candles are manufactured, and in former times ship-building was carried on. Granite of a superior quality is quarried. Pop. (1890), 3,181.

HALSBURY, HARDINGE STANLEY GIFFARD, a criminal lawyer of England, born in 1825. He became a queen's counsel in 1865. As such he was engaged in most of the celebrated criminal trials of his time, including the Overend, Gurney and Tichborne cases. In 1875-80 he was solicitor-general. On the accession to office of the Salisbury government in 1885 he was made lord chancellor of England. This is a remarkable exception to the rule of the English bar—that no criminal practitioner ever reaches the woolsack.

HAMBURG, FREE CITY AND STATE OF, a republic, constituting a part of the German empire. For its history, government and earlier statistics, see *Britannica*, Vol. XI, pp. 404-50.

The State reported in the census of Dec. 1, 1885, area of 160 square miles, and a population of 518,620. Included in the census returns were two battalions of Prussian soldiers, forming the garrison of Hamburg. The State consists of three divisions, the population of each of which was as follows on Dec. 1, 1885: City of Hamburg, with suburb, 305,690 (estimate for 1888, 315,033); 15 rural districts (Vororte), 165,737 (estimate for 1888, 201,057); Cuxhaven, Ritzebüttel, etc., 47,193. In the four years from 1867 to 1871 the population of the State increased at the rate of 2.51 per cent. per annum; from 1871 to 1875 at the rate of 3.41; 1875-80 at 3.10, and in 1880-85 at 2.66 per cent. yearly. A large stream of emigration, chiefly to America, flows through Hamburg. Of the population in 1885, 252,853 were males and 265,767 females, *i. e.*, 105.1 females per 100 males. There were 13,563 foreigners resident in Hamburg in 1885; of these 3,060 were Austrians, 2,403 Swedish and Norwegians, 1,825 Danes, 1,735 British, 2,674 other Europeans, 1,531 non-Europeans, and 335 unclassified.

The jurisdiction of the Free Port was on Jan. 1, 1882, restricted to the city and port by the inclusion of the Lower Elbe in the Zollverein; and on Oct. 15, 1888, the whole of the city, except the actual port and the warehouses connected with it (population 152 in 1885), was incorporated in the Zollverein. The alterations in the port necessitated by this step have involved an expenditure of six millions sterling, to which the imperial government contributes two millions.

The following table shows the number of emigrants for 1885 to 1889, inclusive, via Hamburg:

Year.	From Hamburg itself.	Total.	Bound for the United States.
1885.....	1,368	69,408	63,966
1886.....	1,450	88,633	83,504
1887.....	1,632	71,007	66,545
1888.....	1,291	88,737	83,515
1889.....	1,393	74,843	68,481

Hamburg is the principal port of Germany. In 1889 the number of ships which entered the port was 8,079, with a tonnage of 4,819,892.

During 1892 Hamburg suffered terribly from an epidemic of Asiatic cholera introduced by emigrant Russian Jews.

HAMBURG, a village and railroad junction of Fremont county, Iowa, situated near the Missouri River, 12 miles from Nebraska City. It has flour mills and a foundry. Pop. (1890), 1,634.

HAMBURG, a post-borough of Berks county, Pa., at the foot of Blue Mountain and on the east bank

of the Schuylkill River. It has a rolling-mill, foundries, tanneries and steam mills, and several German weekly newspapers. Pop. (1890), 2,134.

HAMERTON, PHILIP GILBERT, an English author, born at Laneside, near Shaw, in Lancashire, Sept. 10, 1834. He began his career as an art-critic by contributing to the "Fine Arts Quarterly," the "Fortnightly," and the "Saturday Review." Since 1869 he has edited the "Portfolio," an art journal which gives special prominence to etchings. Author of *Isles of Loch Awe*, poems (1855); *A Painter's Camp in the Highlands* (1862); *Thoughts About Art* (1862); *Etching and Etchers* (1866); *Contemporary French Painters* (1867); *Wanderholme*, a novel (1869); *The Unknown River* (1870); *The Intellectual Life* (1873); *The Life of Turner* (1878); *The Graphic Arts* (1882); *Landscape* (1885); and *French and English* (1889).

HAMILTON, a city of Hancock county, Ill., opposite Keokuk, Iowa, on the Mississippi River, and at the foot of Des Moines Rapids. It is an excellent fruit region, has abundant water-power, and several manufactories. Pop. (1890), 1,301.

HAMILTON, a post-village of Caldwell county, Mo., 50 miles east of St. Joseph. It has machine shops, flouring-mills, and is a shipping point for grain, cattle, horses and hogs. Pop. (1890), 1,641.

HAMILTON, a city and capital of Butler county, Ohio, located on both sides of the Miami River. In 1890 more than 800 new houses were completed, with nearly as many more in process of construction. The city controls and operates its own gas and water works, and there is a private gas and electric company. Street cars traverse the principal streets. North of the city the river is turned from its channel into an immense reservoir, which feeds a system of hydraulics, and gives fine power to the factories. The city is connected by four railroads with all parts of the country. There are several national and other banks. The public schools are of a high order, and occupy fine buildings. There is a free library and charitable institutions, such as a children's home and the county infirmary. The county court-house, completed in 1890, is a noble edifice, which cost \$300,000. Greenwood cemetery, with its beautiful lake, is well situated. Safe and lock works, stove foundry, buggy factory, carriage factory, Corliss engine works, canning-factory, a hosiery mill, autographic register factory, shop for making laundry machinery, and many others have been established during the last year. The Niles tool shop is well equipped, and the Hamilton tile factory is on a large scale. There are woolen mills, flouring-mills and six paper mills. Population in 1880, 11,000; 1890, 17,519.

HAMILTON COLLEGE. See COLLEGES, in these Revisions and Additions.

HAMILTON, FRANK HASTINGS (1813-86), an American surgeon. He was licensed to practice medicine in 1833; was chosen professor of surgery in the Western College of Physicians and Surgeons, in Fairfield, N. Y., in 1839; and in 1840 was called to the Medical College in Geneva, N. Y. In 1846 he became professor of the Buffalo Medical College, and in 1859 was elected to fill the chair of principles and practice of surgery in the Long Island College hospital. From 1861 to 1863 he served as surgeon in the army, and attained the rank of lieutenant-colonel. From 1868 to 1875 he was professor of surgery in the Bellevue Hospital Medical College, and was surgeon to the hospital from 1863 to his death. Besides numerous contributions to medical journals, Dr. Hamilton wrote *Treatise on Strabismus* (1844); *Treatise on Fractures and Dislocations* (1860); *Practical Treatise on Military Surgery* (1861); and *The Principles and Practice of Surgery* (1872).

HAMILTON, JAMES (1786-1857), an American statesman. He was admitted to the bar; practiced in Charleston, S. C.; served in the war of 1812 as a major; and for several years was mayor of Charleston. He was several times a member of the legislature, and from 1822 to 1829 was a member of Congress. Subsequently he removed to Texas, and at the time of his death was a United States Senator-elect from that State.

HAMILTON, JAMES (1819-78), an American artist. He was born in Ireland, emigrated to Philadelphia, Pa., and in 1856 began furnishing illustrations for books. He illustrated Dr. Kane's *Arctic Explorations*, the *Arabian Nights*, the *Ancient Mariner*, and other popular works. Among his pictures are *Capture of the Serapis*, *Old Ironsides*, *Wrecked Hopes*, *Egyptian Sunset*, *Morning off Atlantic City*, and *Moonlight Scene Near Venice*.

HAMILTON, JOHN CHURCH (1792-1882), an American lawyer, son of Alexander Hamilton. He practiced law for a time in New York city, and in 1814 joined the United States Army, but resigned the same year. During his active service he was aide-camp to Gen. W. H. Harrison. He wrote *Memoirs of Alexander Hamilton*, and edited his father's *Works*.

HAMILTON, LORD GEORGE FRANCIS, an English statesman, born at Brighton in 1845. In 1868 and again in 1874, he was elected to Parliament; became under-secretary for India, and four years later succeeded Lord Sandon as vice-president of the committee of council on education. In 1885 Lord Salisbury nominated him first lord of the admiralty, which office he held also under Salisbury's recent administration. Lord George was made governor of Tasmania in January, 1887.

HAMILTON, SCHUYLER, an American soldier, son of John Church, born in 1822. He entered the United States Army in 1841; served on the plains; was assistant instructor at West Point; distinguished himself several times during the Mexican war, and from 1847 to 1854 was aid-de-camp to Gen. Winfield Scott. In 1861 he volunteered as a private in the 7th New York regiment; acted as military secretary to Gen. Scott; was commissioned brigadier-general of volunteers; participated in several important undertakings, and was made major-general in September, 1862. On account of feeble health he resigned in 1863. He published a *History of the National Flag of the United States* (1852).

HAMLEY, GENERAL SIR EDWARD BRUCE, K. C. B., K. C. M. G., M. P., born in 1824. He served throughout the Crimean war, and in the Egyptian campaign (1882); was commandant of the Staff College 1870-77, and has held other important positions. He has received the Crimean medal with four clasps, the Egyptian war medal, and eight other decorations. In 1854 he produced a charming tale called *Lady Lee's Widowhood*. His *Operations of War*, of which several editions have appeared, is a recognized text-book for military examinations. He has written several other books and pamphlets on various subjects. In 1890 *The War in the Crimea* appeared from his pen. He has represented Birkenhead in Parliament since 1885.

HAMLIN, HANNIBAL, an American statesman, born in 1809. He was admitted to the Maine bar in 1833, and from 1836 to 1840, and again in 1847, was a member of the legislature. In 1842 he was elected to Congress, and reelected in 1844. In 1848 he was elected United States Senator, but resigned in 1857 to be inaugurated governor. Less than a month later, however, he resigned the governorship to accept a full term in the United States Senate. He held this last position until 1861, when he

again resigned and became Vice-President with Mr. Lincoln. His term expired in 1865. Mr. Hamlin was United States Senator from Maine from 1875 to 1881. He died in 1891.

HAMLINE, LEONIDAS LENT (1797-1867), an American M. E. bishop. For several years he practiced law at the Ohio bar, and in 1828 was united with the M. E. church. Shortly afterward he was licensed to preach, and in 1834 was stationed at Wesley Chapel, Cincinnati. In 1836 he became assistant editor of the "Western Christian Advocate," and in 1841 became editor of the "Ladies' Repository." In 1844 he was elected bishop. He resigned the office in 1852, and, by his own request, was placed on the list of superannuated preachers of the Ohio Conference.

HAMMER-BEAM, a portion of an open timber roof, forming a truss at the foot of the rafter, which gives strength and elegance to the construction.

HAMMER-CLOTH, a cloth which covers the driver's seat in some carriages.

HAMMOND, a railroad center of Lake county Ind., 20 miles from Chicago. It has large steel works and an extensive slaughter-house.

HAMMOND, JAMES HENRY (1807-1864), a United States statesman. He was admitted to the bar in 1828, and in 1830 became editor of the "Southern Times," published at Columbia, S. C. In 1835-36 he was a member of Congress, and from 1842 to 1844 was governor of South Carolina. From 1857 to 1860 he was a United States Senator, retiring on the secession of South Carolina.

HAMMOND, SAMUEL (1757-1842), an American soldier. He served in the Indian wars of the American colonies, and in the Revolution was present at the battle of Stono Ferry, S. C., at the siege of Savannah, at Blackstocks, at the siege of Augusta, and at the battles of King's Mountain, Cowpens and Eutaw. He was twice wounded, and attained the rank of colonel of cavalry. After the war he was appointed surveyor-general of Georgia, and from 1803 to 1805 was a Democrat in Congress. From 1805 to 1824 he was military and civil commandant of Upper Louisiana, and from 1831 to 1835 Secretary of State.

HAMMOND, WILLIAM ALEXANDER, an American physician, born in 1828. He entered the United States Army in 1849 as assistant surgeon, and in 1860 accepted a professorship of anatomy and physiology in the University of Maryland. At the beginning of the civil war he again entered the army, and in 1862 was appointed surgeon-general. In 1867 he became a professor in Bellevue Hospital Medical College, and then a member of the faculty of the University of the City of New York medical department. In 1882 he lectured on diseases of the nervous system in the New York Post-Graduate Medical School. Among his published works are *Physiological Memoirs* (1863); *A Treatise on Hygiene*, with special reference to the military service (1863); *Sleep and Its Derangements* (1869); *Diseases of the Nervous System* (1871); *Lal* (1884); *A Strong-Minded Woman* (1885); *On The Susquehanna* (1887).

HAMMONTON, a village of Atlantic county, N. J., on the Camden and Atlantic and the Philadelphia and Atlantic City railroads, half way between Philadelphia, Pa., and Atlantic City, N. J. Much fruit is grown here, and the village has manufactories of boots and shoes. Population (1890), 3,833.

HAMPDEN-SIDNEY COLLEGE. See COLLEGES, in these Revisions and Additions.

HAMPTON, a village of Franklin county, Iowa, situated on the Central Railroad of Iowa, 29 miles south of Mason City. It is the county-town, and contains a court-house, several churches, and a high school.

HAMPTON, the county-seat of Elizabeth City county, Va., two miles from Fortress Monroe. The principal trade is in oysters, fish, and garden produce. The village contains a famous normal and agricultural school, organized in 1868, for Indians and colored youth. A national cemetery is here, and an asylum for disabled soldiers. The small harbor opens into Hampton Roads. Pop. (1890), 2,513.

HAMPTON ROADS, the deep, broad channel opening from Chesapeake Bay into the James River. It was the scene of important operations during the civil war.

HAMPTON, WADE (1754-1835), an American soldier. He served with distinction in the Revolutionary war; was a member of Congress from 1795 to 1797 and from 1803 to 1805, and in the war of 1812 was a major-general. At the time of his death he was the wealthiest planter in the United States, and the owner of 3,000 slaves.

HAMPTON, WADE (1791-1858), an American soldier, son of the preceding. He was a lieutenant of dragoons in 1813, and acting inspector-general and aid-de-camp to Gen. Jackson at New Orleans in 1815. He succeeded to his father's estate.

HAMPTON, WADE, a United States Senator, born in 1818. He served in both branches of the South Carolina legislature; was a member of the Senate when the State seceded; was a member of the Confederate army during the war; was elected Governor of the State in 1876; and again in 1878, and was chosen to the United States Senate in December, 1878. He took his seat in 1879, and in 1884 was re-elected. His term of service expired March 3, 1891.

HANCHINOL (*Heimia salicifolia*), a Mexican plant of the natural order *Lythaceæ*, with lanceolate leaves, and flowers on one-flowered stalks. It is esteemed as a medicine.

HANCOCK, a village of Houghton county, Mich., situated on Portage Lake, opposite Houghton. It is connected with Lake Superior by a ship-canal, is a terminus of the Mineral Range railroad, and derives prosperity from its location in the copper region. The village contains several smelting-furnaces and stamping-mills. Pop. (1890), 1,172.

HANCOCK, WINFIELD SCOTT, was born in Montgomery county, Penn., February 14, 1824. He graduated at West Point in 1844, served with credit in Scott's campaign in Mexico, and on frontier duty until 1861, when he held the rank of captain. Having been appointed brigadier-general of volunteers in 1861, he served in the army of the Potomac throughout its existence. For distinguished service on the peninsula and at South Mountain and Antietam, he was given a division and the rank of major-general, and in 1863 he was placed in command of the second corps, for his services at Fredericksburg and Chancellorsville. His crowning glory was won at Gettysburg. Reynolds fell on the first day, and Hancock was sent forward by Meade to arrange the line until the commander could arrive. On the second and third days Hancock commanded the left center, on Cemetery Ridge, where, just in the moment of victory, he was severely wounded. He received the thanks of Congress, and returned to the command of his corps early in 1864, in time to take part in Grant's campaigns of that year. He distinguished himself again and again at the Wilderness, at Spottsylvania, and in the Cold Harbor and Petersburg operations. At the end of the war he commanded various departments, having been made a major-general in the regular army. From September, 1867, to March, 1868, he commanded the department of the Gulf, under the reconstruction acts; and certain orders issued by him, particularly those of November 29,

(1.) THE ATLANTIC SEABOARD.—Calais, Me., is the easternmost harbor of the United States. It is the center of a considerable lumber trade. At Calais's point, five miles from the town, there is a bar or ledge only eight feet deep at low water. There is no anchorage in the harbor. Eastport, Me., has a harbor free of ice in winter. There are two entrances to Rockland, Me., has an open harbor five fathoms deep within half a mile of the wharves, and three fathoms to the wharves. But it is often closed by ice in winter. Bangor Harbor, Me., is in Frenchman's Bay, and one of the best on the east coast. Penobscot Bay can carry six to fourteen fathoms up to the town of Bucksport, and there is a good anchorage but a very strong current. Bangor, at the head of this bay, has an extensive lumber and ice trade. The bay is closed by an extensive winter. Fort Knox, at the narrows of the Penobscot, defends the harbor. The harbor of Wiscasset, near Bath, Me., can hardly be surpassed by any. Its depth is six fathoms in the channel of the river. Bath has the largest ship-building and ship-owning interest in the State of Maine. It is 12 miles up the Kennebec River, which has so strong a

current that the ice can seldom close it up. The entrance of the river is defended by Fort Poplar, Portland, Me., on a peninsula of the Casco Bay, has a harbor which can carry five fathoms to within half a mile of the wharves and 16 feet up to the wharves. There are four entrances to the harbor, three of them rather crooked and shallow. Only the most southern entrance can be used by large vessels. The harbor is defended by Forts Gorges, Preble, Scammel, and a battery on Portland Head. Portland has a large foreign and coasting trade, and is the principal shipping port for Canada during the winter, as the harbor is always free of ice. Richmond Island harbor, near Portland, has a good anchorage of five fathoms' depth, and can easily be entered when vessels cannot get into Portland.

Portsmouth Harbor, N. H., has a good anchorage, and six fathoms can be carried up to the city. A U. S. navy-yard is opposite Portsmouth, distant half a mile. For vessels not going up to the city or navy-yard the usual anchorage is at Pepperell's Cove in from six to 11 fathoms. Portsmouth harbor is never closed by ice. It is defended by Forts Constitution, McClary and Sullivan, all in a dilapidated condition.

Newburyport Harbor, Mass., has a bar with only six feet of water at low tide, but this obstruction is being removed. Rockport harbor, Mass., on the northern shore of Cape Ann is 8 fathoms deep to the wharf. It is the best harbor of refuge in that neighborhood. In Massachusetts Bay, between the headlands of Cape Ann and Cape Cod, there are several important harbors, those of Gloucester, Salem, Boston, Plymouth and Provincetown. Gloucester harbor has a good anchorage in five fathoms within 600 yards of the shore, and in three and a half fathoms close to the shore. But it is frozen over in winter. The city of Gloucester has the largest fishing industry in the United States. Salem harbor can carry three and a half fathoms within half a mile of the town of Salem. The inner harbor is often closed by ice during January and February. Forts Lee, Pickering and Sewall defend this harbor. The city of Salem has a considerable coasting and ice trade. Boston harbor can carry 21 feet at any tide through the main channel. There are two other channels. It is defended by Forts Warren and Independence. The U. S. navy-yard is situated near Charlestown, opposite the city of Boston. A very extensive foreign and coastwise trade is carried on here, only second to that of New York. Plymouth harbor is often frozen over, especially the inner harbor. Only 21 feet can be carried into the outer harbor. Provincetown has one of the finest harbors on the Atlantic coast. It has plenty of water, good holding ground, and is easy of access. Except during severe winters this harbor is clear of ice. Sandwich harbor, in the southwestern part of Cape Cod Bay is the proposed terminus to the ship-canal from Cape Cod Bay, to the head of Buzzard's Bay; now it has a narrow and difficult entrance. New Bedford harbor can carry 16 feet into the inner harbor through a narrow, crooked channel. The outer harbor is an open roadstead with 4½ fathoms of water. There are forts at Clark's Point and Fort Point.

Newport, R. I., has a fine harbor with water enough for the largest ships; 19 feet can be carried into the inner harbor; Block Island Basin is an artificial harbor made by the United States Government for the shelter of small vessels. It is 7 feet deep and protected by a solid stone breakwater. The United States torpedo station is located at Newport harbor. Fort Adams and some earthworks on Dutch Island defend it. The town of Bristol, R. I., north of Newport, has a good anchorage in 5 fathoms of water, and off the lower end of the town the anchorage is 21 feet. Twenty-one feet can be carried through a dredged channel up to Providence. The nearest anchorage, in 5 fathoms, is four and a half miles distant from the city.

New London Harbor, Conn., is on Long Island Sound. It is formed by the lower portion of the Thames River and has a depth of 80 feet. Being three miles in length, it is one of the finest harbors in the United States. The entrance is defended by Forts Trumbull and Griswold. New Haven Harbor is only 12 feet deep near the city, and even this depth is only found in a narrow channel. But four miles south of New Haven the water becomes 5 fathoms deep. The harbor is defended by Fort Hale. Long Island Sound is very free from dangers throughout its length, and affords many anchoring places for light-draught coasters.

New York Harbor is one of the finest and most capacious harbors of the world. It is entered from Long Island Sound through the East River; the Upper New York Bay is entered from the ocean through the Narrows, between Staten Island and Long Island. The East River forms a large part of the water front of New York and Brooklyn, and for miles there are docks stretching along its shores. The East River channel was formerly obstructed by dangerous rocks and reefs at Hell Gate, both in mid-channel and projecting from the shores of small rocky islands; but these obstructions have been removed (see HELL GATE in these Revisions and Additions), and a large foreign trade now takes this route. Eight miles below the Upper Bay is Lower New York Bay. It is itself a harbor sufficiently large to accommodate all the fleets of the world. The Hudson or North River forms also a large part of New York's water-front. The defenses of the New York harbor are Fort Schuyler on Throgg's Neck, at the western entrance of Long Island Sound, and a fort on Willet's Point on the opposite shore; Forts Wadsworth and Tompkins at the Narrows, and several detached batteries on

the Staten Island shore; and Fort Hamilton and several batteries on the opposite Long Island shore. The forts in the bay are Fort Columbus, Castle William and some batteries all on Governor's Island, and Fort Gibson on Ellis Island.

Perth Amboy, N. J., has a harbor with 11 feet of water up to the town; mean rise and fall of tide, 5½ feet. It seldom freezes over. Steamers can generally force their way through the ice when any is formed.

The harbor of Wilmington, Del., has only 12 feet of water, while the Delaware River has 20 feet up to near the city of Wilmington.

Hampton Roads, Va., is a channel between Chesapeake Bay and the estuary of the James River, where the naval action between the *Monitor* and the Confederate iron-clad *Merrimac* took place in 1862. It is defended by Fortress Monroe. This channel affords an excellent rendezvous for a fleet. There is plenty of water for vessels of any draught from the entrance of Chesapeake Bay very near the fortress. Newport News is on the north, and Norfolk and Portsmouth are on the south side of this channel. The United States navy-yard is situated at Gosport, adjoining Portsmouth, and nearly opposite to Norfolk. Vessels drawing 21 feet of water can be carried to any of these cities. At Annapolis harbor, Va., vessels drawing 19½ feet of water can be carried over the bar. The United States Naval Academy is situated at Annapolis. To the city of Baltimore, Md., 24 feet can be carried through a dredged channel, and 19 feet can be carried to the city of Washington, which is 200 miles from the ocean.

Newberne, N. C., is at the head of Pamlico Sound. Ten feet can be carried to the town, but only 8 feet over the bar from the sea into the Sound. The same can be said about Plymouth, N. C., which is at the head of Albemarle Sound. These places ship lumber, tar, and turpentine. Wilmington, N. C., is 30 miles above the mouth of the Cape Fear River. Eight feet can be carried over the outer bar at the mouth of the river, and 7 feet in the river channel to the city. The town of Wilmington has a considerable trade in lumber, cotton, and turpentine.

Georgetown, S. C., is 14 miles from the bar at the entrance on Winyaw Bay. Seven and one-half feet can be carried to the town. Georgetown ships some lumber and turpentine. To Charleston harbor, S. C., 21 feet can be carried up the South Channel; but over the bar to the channel only 14 feet can be carried. Charleston has a large foreign trade, shipping quantities of cotton, phosphate, and Southern products. Port Royal, S. C., at the head of Port Royal Sound, has a fine harbor with 21 feet of water over the bar. Brunswick, S. C., has one of the best harbors on the coast, a deep arm of the sea, 20 miles long, leads to the town and approaches it by a channel 17 feet deep.

To Savannah, Ga., 9 feet can be carried, while 17 feet can be carried over the bar at the mouth of the river. The town ships large quantities of cotton, rice, lumber, and naval stores. St. Mary's, Ga., on St. Mary's River, has a good harbor. There are several anchorages inside the bar in from 4 to 7 fathoms of water. Seventeen feet can be carried to the town, 10 miles from the ocean.

To Jacksonville, on the St. John's River, nine feet of water can be carried over the bar through a narrow, crooked channel. It is 20 miles from the mouth of the river. The Florida harbors ship mostly lumber. St. Augustine has a shifting bar with 10 feet of water, inside of which there is a good harbor north of the town 18 to 20 feet deep.

(2.) THE GULF COAST.—Key West, southwest of the southern end of Florida, has a good anchorage for the largest vessels within a mile of the town. Three channels, the main ship channel, the southwest and the northwest channels, having from 12 to 30 feet of water, lead to this harbor. It is defended by Fort Taylor, some batteries, and two Martello towers. Key West ships mostly cigars and sponges. The Dry Tortugas, a group of ten low islets, west of Key West, form a large, deep and commodious harbor. It is of great strategic importance in the case of a war with a foreign naval power, because it will afford its possessor an excellent base for naval operations. This splendid harbor is defended by Fort Jefferson, on Garden Key. Tampa Bay, Fla., is an estuary from six to ten miles wide and extending northeast for 20 miles, where it forms two arms. It affords anchorage in five fathoms of water. Cedar Keys, Fla., has three channels leading to the town. Cedar Key is the deepest of these channels, with 15 feet of water up to its bar. Cedar Key is the terminus of the Florida Railroad. Apalachicola Bay is the seaport of Tallahassee. It is very shallow, and therefore seldom visited. To Apalachicola, at the mouth of the river of the same name, 15 feet can be carried over the bar at the entrance of the bay; but only four feet can be carried to the town. It is a shipping port for lumber. St. Joseph's Bay is a large, deep and commodious harbor just north of Cape San Blas. It can be entered in a gale or hurricane, and affords excellent anchorage. Pensacola Bay, Fla., is protected by Santa Rosa Island, and has an entrance 20 feet deep. It is defended by Forts Pickens, McRee, and Barrancas, besides a redoubt on the north side. The city of Pensacola is 10 miles from the entrance, and ships large quantities of lumber. The United States navy-yard is within three miles of the city.

Mobile Bay, Ala., is an estuary 35 miles long. The Mobile River, a large navigable stream, flows into this bay. The bay's entrance between Fort Morgan and Dauphin Island is nearly three miles wide. Eighteen feet can be carried through a dredged channel 21 miles long to the city of Mobile. This

harbor is the natural outlet of the greatest cotton region of the United States.

New Orleans, La., is 120 miles from the sea. The Mississippi River surrounds the city on three sides. Where the river flows into the Gulf of Mexico it spreads out into four prongs, called the Southwest, Southeast, Northeast, and South Passes. The famous jetties of Captain James B. Eads are at the entrance of the South Pass. It is 26 feet deep and 800 feet wide. The other three passes are only from 7 to 15 feet deep. The Mississippi delta and the neighboring waters are defended by the following works: Forts Pike, Macomb, Livingston, Jackson, and Philip, Tower Dupré, Battery Bienvenue, and the Tower at Proctorsville. New Orleans ships large quantities of cotton and sugar.

To Galveston harbor, Texas, 11 feet can be carried over the outer bar, and 9½ feet to the city wharfs. Appropriations have been made for deepening the entrance. It is defended at Fort Point and Bolivar Point. Galveston's trade is similar to that of New Orleans.

(3) THE PACIFIC COAST.—Port Townsend, Washington, on the Strait of Juan de Fuca, has a fine harbor, and five to nine fathoms can be carried within 400 yards of the town. Up to the wharfs of Seattle on Puget Sound five fathoms can be carried, and there is plenty of water at the anchorage off the town. Seattle has a large trade in lumber.

Astoria, Oregon, at the mouth of the Columbia River, has usually over 25 feet of water from the bar to the town. The depth of the bar varies.

Crescent City, Cal., has a very dangerous harbor with many shoals and rocks. San Francisco has one of the finest harbors in the world. Twenty-three feet can be carried over the bar to the city and in almost any part of the bay. It is connected with the ocean by a strait called the Golden Gate. The entrance of the harbor is defended by Fort Point, on the south shore of the Golden Gate, and another fort has been constructed on Alcatraz Island, two miles north of the city. Vallejo is situated 27 miles north of San Francisco Bay, on the opposite side of Napa Creek from the United States navy-yard. To the anchorage between the town and the navy yard 21 feet of water can be carried at low tide. Santa Cruz, Cal., has a well-protected harbor with good anchorage in water from 3½ to 15 fathoms deep. Santa Barbara, Cal., has a harbor open on the south side, but partially protected by an island. It is 19 feet deep at the wharfs. It exports much fruit and some wood. The harbor of San Diego is formed by a projecting point of land on the west side, which terminates at

the south end in Point Loma, and on the east side by a flat peninsula. The entrance to this fine harbor is over a bar with 21 feet of water.

(4.) For LAKE HARBORS, see NAVIGATION, INLAND, in these Revisions and Additions.

Docks are divided into wet docks, dry docks, and floating docks. For the description of the wet and dry docks, see Britannica, Vol. XI, p. 465.

"Floating sectional dry-docks" consist of several sections joined together by sliding beams. Each section consists of a large rectangular tank, at the sides of which are frames formed of four uprights. In each of these frames a float moves up and down in suitable gearings. It rises when a section is being lowered, and goes down when a tank is being raised.

In the "tubular floating-docks," both the bottom and vertical sides consist of large wrought-iron tubes. The bottom consists of eight such tubes running longitudinally; and the sides consist of many similar tubes fixed vertically inside of the two outer longitudinal tubes. The tubes are divided into many water-tight compartments, and have water-valves at the bottom. When the dock is to be sunk these valves are opened. When it is to be raised, compressed air is forced into the tubes, and the water is thus expelled through the valves. As soon as the dock and its vessel are fully raised the bottom valves are closed again.

By the "hydraulic lift-dock" the vessel is lifted bodily out of the water upon a raft-like pontoon, which has sufficient buoyancy to sustain the weight of the vessel. For this purpose the pontoon is brought up between two rows of columns extending down to the dock below. These columns carry hydraulic lifts. From the heads of these lifts some rods extend and are made fast to lattice girders reaching across to the opposite column. Upon these girders the pontoon rests. When the pontoon is raised the water is let out by valves in the bottoms of its tubes. As soon as the ship is lifted it may be floated away on its own pontoon; and the dock is left free to be used on another pontoon to raise a second ship.

A "balance floating-dock" consists of a large rectangular tank having hollow walls along its two long sides, but no walls at the ends. It is divided into a number of compartments. By pumping water into these side chambers any part of the dock may be lowered; and by forcing compressed air into them and the water out of them, they may be raised. Thus the dock can be balanced at any desired level.

DRY DOCKS IN THE UNITED STATES OF MORE THAN 58 FEET BREADTH:

Ports.	Length over all.	Width of entrance at the top.	Depth over sill at high-water spring-tides.	Kind of dock.	Material.	Location.
Buffalo	350	60	10	Basin		{ Foot Orleans St.
Detroit	308	65	18	"	"	
"	360	75	11.5	"	"	
Albina, Oregon	400	72	28	"	"	{ Hunter's Point.
San Francisco	210	60	20	Floating	Wood	
"	450	90	24	Basin	Stone	
"	529	78	26.5	"	"	{ Navy Yard.
Portland, Me.	425	80	24	"	Wood	
Portsmouth, N. H.	350	90	23	Floating	Stone	
Boston	379	60	25	Basin	Stone	{ East Boston.
"	365	64	17.5	"	Wood	
"	330	90	18.5	Balance	"	
New York	860	100	20	Section'l	"	{ Between Pike and Clinton St.
"	250	75	16	"	"	
"	170	65	16	"	"	
Brooklyn	350	66	25	Basin	Stone	{ Navy Yard.
"	540	100	22	"	Wood	
"	630	85	25	"	"	
Jersey City	185	62	14	Balance	"	{ Foot Essex St.
Philadelphia	494	70	21.5	Basin	"	
"	200	62	14	Section'l	"	
Baltimore	504	80	23	Basin	"	{ Locust Point.
"	250	67	14	Floating	"	
"	320	60	16	Basin	Stone	
Norfolk	315	90	16	Floating	Wood	{ Gosport.
New Orleans	220	75	14	"	"	
"	225	75	16	"	"	

HARCOURT, SIR WILLIAM VERNON, son of the late Rev. W. V. Harcourt, of Nuneham Park, Oxford, and grandson of a former archbishop of York, was born Oct. 14, 1827, and educated at Trinity College, Cambridge, where he graduated with high honors in 1851. Called to the bar in 1854, he was made queen's council in 1866, and in 1868 was returned to parliament for the city of Oxford as a Liberal. In 1873 he was appointed solicitor-general, and received the honor of knighthood. He held office until Mr. Gladstone's retirement in February, 1874, and when that statesman returned to power in 1880 he was appointed home secretary. Failing to secure reelection at Oxford, he was soon afterward returned from Derby, for which constituency he has continued to sit up to the present time. In 1886 he was appointed chancellor of the exchequer. Retiring the same year with Mr. Gladstone he again came into office with him in 1892 and was at once installed in the Exchequer as before.

HARDEE, WILLIAM JOSEPH (1818-73), an American soldier. He served in Florida for a time as first-lieutenant of 2d dragoons, and in 1844 was made captain. In 1847 he was promoted major for gallantry at the siege of Monterey, and at the close of the war was brevetted lieutenant-colonel. From 1856 to 1861 he was at West Point as commandant of cadets, and then joined the Confederate army with the rank of colonel. He served with distinction during the war, and attained the rank of lieutenant-general. At the close of the war he retired to his plantation in Alabama.

HARDIE, JAMES ALLEN (1823-76), an American soldier. He entered the artillery service in 1843; was an assistant professor in West Point in 1844, and served in garrison, frontier and Indian service till 1861. At the beginning of the civil war he was made lieutenant-colonel of the 5th artillery, and served through the war with distinction, attaining the brevet rank of major-general, United States Army. In 1866 he was senior member of a commission to inspect ordnance and ordnance stores in forts and arsenals.

HARDING, CHESTER (1792-1866), an American artist. He became a house-painter, and later devoted himself to portrait painting. He established himself in St. Louis, and in 1826 settled in Boston, where he became very popular. Among the distinguished persons who sat before him were James Monroe, James Madison, John Quincy Adams, Chas. Carroll, John Marshall, Wm. Wirt, Henry Clay, John C. Calhoun, Washington Allston, the dukes of Norfolk, Hamilton, and Sussex, Samuel Rogers, Sir Archibald Alison, Daniel Webster, and W. T. Sherman. He wrote *My Eglogistography*.

HARDING, SIR ROBERT PALMER, an English lawyer, born in 1821. He commenced his law practice in 1847, and has since taken part in many important liquidation cases, including the celebrated case of Overend, Gurney & Co., in which the liabilities amounted to nearly 20 million pounds sterling. In 1864 he was appointed a commissioner to inquire into the working of the Bankruptcy act; and in 1883 he reorganized this department on the basis of the Bankruptcy act of 1883. In January, 1890, he was knighted. At present he is a director in the Imperial British East Africa Co.

HARDWOOD TREES, forest trees, of comparatively slow growth, producing compact, hard timber, as oak, ash, elm, chestnut, walnut, beech, birch, etc. From these willows, elders, poplars, etc., are distinguished as *soft-wooded trees*. Neither term is of ordinary use extended to firs, pines, cedars or other coniferous trees.

HARDY, ARTHUR SHERBURNE, an American author, born in 1847. In 1869 he entered the United

States Army as second-lieutenant, but resigned the following year and became professor of civil engineering and applied mathematics in Iowa College, Grinnell. He then became professor in Chandler Scientific School of Dartmouth, and held this position until 1878, when he became professor of mathematics in the college proper. Prof. Hardy is the author of *Elements of Quaternions* (1881); *Imaginary Quantities* (1881); *New Methods in Topographical Surveying* (1844); a poem entitled *Francesca of Rimini*, and two novels, *But Yet a Woman* (1883); and *The Wind of Destiny* (1886).

HARDY, THOMAS, an English novelist, born in Dorsetshire June 2, 1840, commenced his career as an architect and prosecuted his studies in design at London, gaining such professional distinctions as the prize and medal of the Institute of British Architects, and Sir W. Tite's prize for architectural design, both in 1863. His first literary effort was a novel published in 1871, entitled *Desperate Remedies*. His next novels, *Under the Greenwood Tree* (1872), and *A Pair of Blue Eyes* (1873), prepared the way for his best work, *Far from the Madding Crowd*, which was published in the "Cornhill Magazine," in 1874. Other novels from his pen are: *The Return of the Native* (1878); *The Trumpet-Major* (1880); *A Laodicean* (1881); *Two on a Tower* (1886); *The Mayor of Casterbridge* (1886); and *The Woodlanders* (1887).

HARDY, SIR THOMAS DUFFUS, born in 1804 at Port Royal, Jamaica, died in London, June 15, 1878. At the age of fifteen he became a junior clerk in the Tower of London, was made deputy-keeper of the public records in 1861, and knighted in 1870. He won great distinction by his editions of ancient manuscripts. Among his important works were two folio volumes of the early *Close Rolls* (1833-44); one of the *Patent Rolls* (1835), and others of the *Norman Rolls and Charter Rolls*; *William of Malmesbury* (1840); a *Descriptive Catalogue of MSS.* relating to the history of Great Britain and Ireland (1862-71); and other works of much historical value.

HARE, a rodent mammal of the family *Leporidae*. See *Britannica*, Vol. XI, p. 476.

HARE, AUGUSTUS JOHN CUTHBERT, an English writer, born at Rome, Italy, in 1834. He received his education at Harrow and at the University College, Oxford. Afterwards he edited Murray's *Hand-books* for some English counties. His most interesting books are: *Walks in Rome*; *Days Near Rome*; *Wanderings in Spain*; and *Walks in London*. His *Memorials of a Quiet Life* contains charming biographies of various members of the Hare family. He wrote all the books here mentioned from 1870 to 1877.

HARE, ROBERT (1781-1858), an American scientist. He early showed an interest in chemistry and physics, and before he was twenty was a member of the chemical society of Philadelphia. In 1801 he invented the oxyhydrogen blowpipe, and later made many valuable contributions to science. In 1818 he became professor of chemistry in William and Mary College, and also accepted a similar position in the medical department of the University of Pennsylvania. He resigned his position in 1847. Later he became a believer in spiritualism, and lectured in its advocacy. He made numerous contributions to scientific literature, and published *Brief View of the Policy and Resources of the United States* (1810); *Chemical Apparatus and Manipulations* (1839); *Compendium of the Course of Chemical Instruction in the Medical Department of the University of Pennsylvania* (1840); *Memoir on the Explosiveness of Nitre* (1850); and *Spiritualism Scientifically Demonstrated* (1855).

HARE, SILAS, a United States Congressman, born in 1827. He served one year in the war with Mexico; was admitted to the Indiana bar in 1850, but shortly afterwards removed to Texas. In 1862 he was chief justice of New Mexico under the Confederate government, and then served till the close of the war as a captain. In 1865 he settled in Sherman, Texas, and was criminal district judge from 1873 to 1876. He was elected to the 50th Congress as a Democrat, and reelected to the 51st.

HARE, WILLIAM HOBART, an American P. E. bishop, born in 1838. He was ordained deacon in 1859, and priest in 1862. In 1864 he was elected rector of the Church of the Ascension in Philadelphia; next became general agent of the foreign committee of the board of missions, and in 1872 was elected missionary bishop of Niobrara. His jurisdiction in 1883 was extended over the southern part of Dakota.

HARELD (*Harelda*), a genus of the duck family, having a short thick bill, and two feathers of the middle of the tail, in the male, greatly elongated. Two species are known; the best known, the long-tailed duck, or hareld (*H. glacialis*), inhabits the arctic regions of the Old and New Worlds, its winter migrations in America extending to the Carolinas.

HARGRAVES, EDMUND HAMMOND, the discoverer of the gold-fields of Australia, born at Gosport, England, in 1815. At the age of eighteen he settled in Australia, and in 1849 was attracted to California, where he tried his luck as a gold-digger. While thus engaged he was greatly struck by the similarity in the geological formation of California and Australia, and on his return home he entered upon explorations which resulted in the discovery of the valuable gold-fields of Australia in 1851. He was appointed commissioner of crown lands, and received from the government of New South Wales a reward of £10,000. In 1855, one year after his return to England, he published *Australia and Its Gold-Fields*.

HARLAN, JAMES, born in Clarke county, Ill., August 25, 1820; graduated at Indiana Asbury University in 1845; became superintendent of public instruction for Iowa in 1847, and president of Iowa Wesleyan University. He sat in the United States Senate as a Whig from 1855 to 1857; was disqualified on a technicality, but reelected the same year, and again in 1861. In 1865 he resigned to become secretary of the interior; was again elected to the Senate in 1866, and served from March, 1867, to March, 1873. In 1869 he was appointed president of the Iowa University. He afterward edited the *Washington Chronicle*, and from 1882 to 1885 was presiding judge of the court of commissioners of Alabama claims.

HARLAN, JOHN MARSHALL, was born in Kentucky, June 1, 1833; graduated in law in 1853, and was a judge in Franklin county, Ky. He was in the volunteer service during the war; was attorney-general of his State (1863-67), and an unsuccessful candidate for governor in 1871 and 1875. On November 29, 1877, he became associate justice of the United States Supreme Court.

HARLESS, GOTTLÖB CHRISTOPH ADOLPH VON, German Lutheran theologian, born in Nuremberg in 1806, died Sept. 5, 1879. He studied at Erlangen and Halle; was professor of theology at Erlangen in 1836-45, and at Leipzig from 1845. In 1850 he became chief court preacher at Dresden, and exercised much influence on ecclesiastical affairs in Saxony. In 1852 he was appointed president of the Protestant consistory at Munich. His most important works were his *Theologische Encyclopädie und Methodologie* (1837); and *Christliche Ethik* (1842.)

HARMALIN, a vegetable base, and *Harmin* another, both of which occur in the husks of the seeds of *Peganum harmalas*, or Syrian rue, a zygo-phylleaceous, shrubby plant that grows abundantly in the steppes of Southern Russia. The seeds have been used in dyeing silk, to which they impart various shades of red.

HARMAN, FRANÇOIS JULES, a French explorer, born at Saumar in 1845, died at Florence, April 14, 1883. As a member of the surgical staff in the French navy he took part in various expeditions. He went to Algeria in the campaign against the Kabyles in 1871, then with Garnier to Tonquin. For some time he was governor of Tonquin. In 1874 he returned to France, but set out for Cambodia the next year, and pushed his explorations far to the north of that country. In 1881 he returned to France seriously ill with consumption, and was made keeper of the colonial museum.

HARMER, ALFRED C., a United States Congressman. In 1856 he was elected a member of the city council of Philadelphia, Pa., and served four years. In 1860 he was chosen recorder of deeds for that city, and held the office three years. He was elected to the 42d, 43d, 45th, 46th, 47th, 48th, 49th, 50th and 51st Congresses.

HARMONIC PROPORTION. Three numbers are said to be in harmonic proportion when the first is to the third as the difference between the first and second is to the difference between the second and third. See *Britannica*, Vol. II, pp. 535-36; Vol. X, pp. 382-83.

HARMONISTS, members of a religious community organized by George Rapp (1770-1847), a German of Württemberg. Disturbed by the authorities, they removed in 1803 to Pennsylvania and formed a settlement which they called Harmony. In 1815 they removed to New Harmony, Ind., but returned to Pennsylvania ten years later, and formed the township of Economy, a few miles from Pittsburgh, where they own a large tract of land and carry on important manufactures. They hold all property in common, and strongly discourage marriage and sexual intercourse.

HARMONY OF THE SPHERES, a music, imperceptible to human ears, which the ancients imagined was produced by the motions of the heavenly bodies. These motions were supposed to be governed by fixed laws, the seven planets producing severally the seven notes of the gamut. By some the sound was thought to be imperceptible because always heard; others thought it too powerful for our hearing.

HARMS, KLAUS, a German divine, born at Fahrstedt, Holstein, May 25, 1778, died at Kiel, Feb. 1, 1855. He studied theology at the University of Kiel, was appointed assistant pastor at Lunden in 1806, and pastor at Kiel in 1817. He exercised a powerful influence on the religious life of Germany and the Scandinavian countries. His memorial work, *Das sind die 95 Thesen oder Streitsätze Luther's* 1817, published in celebration of the ter-centenary of the Reformation, produced a sensation in Germany.

HARMS, GEORG LUDWIG DETLEF THEODOR, a German clergyman, born at Walsrode in Lüneburg in 1808. After studying theology at Göttingen he taught a private school till 1844, when he became the assistant of his father, the pastor of Hermannsburg. In 1849, after he had succeeded his father, Harms founded an institute for training young men as missionaries for Africa. He died in 1865.

HARNACK, ADOLF, born in 1851 at Dorpat, Russia, where he studied in 1869-72. In 1874 he was appointed privatdocent for church history at Leipzig, extraordinary professor there in 1876, and ordinary professor successively at Giessen (1879).

Marburg (1886), and Berlin (1888). In critical knowledge of the sources of church history he is thought to have no superior. His chief writings are: *Zur Quellenkritik der Geschichte des Gnostizismus* (1873); *Die Zeit des Ignatius und die Chronologie der antiochenischen Bischöfe* (1878); *Das Mönchtum, seine Ideale und Geschichte* (1882); and *Lehrbuch der Dogmengeschichte* (1886).

HARNACK, THEODOSIUS, a German Lutheran theologian, born at St. Petersburg in 1817, died in 1889. After studying theology at Dorpat, Bonn, and Berlin, he became in 1843 privatdocent of theology at Dorpat. In 1848 he was made professor in the same place. From 1853 to 1866 he was professor at Erlangen, but in the latter year he returned to Dorpat, and in 1873 he retired from the professorship. He published *Die Idee der Predigt*; *De Theologia practical*; *Der Christliche Gemeindegottesdienst*; *Luther's Theologie*; *Die Kirche, ihr Amt, ihr Regiment*, etc.

HARNETT, CORNELIUS (1723-81), an American statesman. He was a promoter of the Revolutionary cause, and in 1773 was placed on the committee of continental correspondence for the Wilmington, N. C., district. He was president of the Provincial Congress, and a signer of the "articles of confederation and perpetual union."

HARNEY, WILLIAM SELBY, an American soldier, born in 1800. He entered the army in 1818 as second-lieutenant of the 19th infantry, and remained in continuous service until 1863, when he was placed on the retired list, having attained the brevet rank of major-general "for long and faithful service." After his retirement he lived in St. Louis. He died in 1889.

HAROERIS, the elder Horus, son of Seb, the Egyptian Saturn, and Nu, or Rhea; the brother of Osiris. He was ruler over heaven, illuminating the world with the brightness of his eyes.

HARPER, a city of Harper county, Kan., situated about 60 miles southwest of Wichita. Population, 1,579.

HARPER, ROBERT GOODLOB (1765-1825), a United States Senator. At the age of fifteen he served in the army, and in 1786 became a member of the North Carolina bar. He was elected to the legislature, and from 1795 to 1801 served in Congress. He served in the war of 1812, and became a major-general. From 1816 to 1821 he was a United States Senator from Maryland. He published *Observations on the Dispute between the United States and France* (1797); *An Address on the British Treaty* (1796); *Letters on the Proceedings of Congress*; and *Letters to His Constituents* (1801).

HARPER'S FERRY, a post-village of West Virginia, situated among beautiful scenery at the confluence of the Shenandoah with the Potomac, where the latter is crossed by a bridge, 81 miles west of Baltimore by rail. It was the scene of John Brown's Abolition raid in 1859; and here a Union army of over 11,500 men, under General D. H. Miles, surrendered to Stonewall Jackson in 1862. The arsenal and armory were burned in 1861, to prevent their falling into the hands of the Confederates. The most flourishing part of the town was destroyed by a flood in the Shenandoah, 1878. Pop. (1890), 958.

HAARP-SHELL (*Harpa*), a genus of gasteropodous mollusks of the whelk family (*Buccinidae*), having the last whorl of the shell large, and covered with numerous sharp, smooth ribs, resembling the strings of a harp. The foot is large, and there is no operculum. These shells are much prized for their beauty. Nine species are known, all of them tropical, and living in deep water, on sandy or muddy bottoms.

HARRIS, HOWELL, one of the fathers and founders of Welsh Calvinistic Methodism, born in 1713 at Trevecca, Wales, in the county of Brecon. His mind was first seriously awakened to religious questions in 1735, and for seventeen years from that date he spent his time as a lay itinerant preacher, confining his ministrations for the most part to Wales. After his retirement to Trevecca in 1752, he still continued to preach daily at his own home; and in order to accommodate those who came to hear him he built a large house, the inmates of which led a kind of monastic life.

HARRIS, ISHAM GREEN, a United States Senator, born in 1818. He was admitted to the bar in 1841, and commenced practice at Paris, Tenn.; was elected to the State legislature as a Democrat in 1847; was chosen to Congress in 1849, and was re-elected in 1851. In 1853 he moved to Memphis, and from 1857 to 1863 was governor of the State. During the last three years of the war he was a volunteer aid on the staff of the commanding general of the Confederate army of Tennessee. In 1877 he was elected to the United States Senate, and re-elected in 1883 and in 1889. His term of service expires March 3, 1895.

HARRIS, JOEL CHANDLER, an American author, was born in Eatonton, Georgia, December 8, 1848, and was in turn printer, lawyer, and journalist. His delightfully original and unexpected book, *Uncle Remus, his Songs and his Sayings; The Folklore of the Old Plantation* (New York, 1880), quickly carried his name even to the Old World, at once to children and scientific students of folklore. Later works are *Nights with Uncle Remus* (Boston, 1883), *Mingo and Other Sketches* (1883).

HARRIS, SAMUEL, an American clergyman and educator, born in 1814. He taught from 1838 to 1841, and then held pastorates at Conway and Pittsfield, Mass., until 1855. He then became professor of systematic theology in Bangor Seminary, and held the position till 1867, when he was chosen president of Bowdoin College. In 1871 he was made professor of systematic theology at Yale. Among his published works are *Zaccheus; the Scriptural Plan of Beneficence* (1844); *Christ's Prayer for the Death of His Redeemed* (1863); *Kingdom of Christ on Earth* (1874); and *Philosophical Basis of Theism* (1883).

HARRIS, SAMUEL SMITH, an American P. E. bishop, born in 1841. He was admitted to the bar in 1860, and engaged in the practice of his profession in Autauga county, Ala., until 1865, when he removed to New York. In 1869 he was ordained priest, and held pastorates at Montgomery, Ala., Columbus, Ga., New Orleans, La., and Chicago, Ill. In 1879 he was consecrated bishop of Michigan. He published *Bohlen Lectures* (1882).

HARRIS, THADDEUS WILLIAM (1795-1856), an American entomologist. He practiced medicine at Milton Hill, Mass., from 1818 to 1831, and then became librarian of Harvard. In 1837 he was appointed a commissioner for a zoological and botanical survey of Massachusetts. Besides many papers on antiquarian research he published *Insects Injurious to Vegetation* (1841).

HARRIS, THOMAS LAKE, an American spiritualist, born in 1823. He entered the ministry of the Universalist church at an early age, and later organized an "Independent Christian Society." In 1850 he became a convert to the spiritualistic faith, and has since lectured throughout the United States and England. He has published *The Epic of the Starry Heavens* (1854); *Modern Spiritualism* (1856); *A Lyric of the Morning Land* (1854); *A Lyric of the Golden Age* (1856); *Truth and Life in Jesus* (1860); and *The Millennium Age* (1861).

HARRISBURG, the county-seat of Saline county, Ill., situated in a county abounding in salt, iron, coal and lead. Agricultural implements are manufactured here. Pop. (1890), 1,723.

HARRISBURG, the county-seat of Dauphin county, Pa., and capital of the State, pleasantly situated on the left bank of the Susquehanna River, which is here crossed by four bridges, each over a mile in length. Besides the State Capitol building, the city contains a court-house, the State arsenal, the State insane asylum, a Roman Catholic cathedral, and some forty other churches. The State library contains about 60,000 volumes. The city is well provided with schools and academies, having, besides Harrisburg Academy and Miss Woodward's Seminary, about 20 large and a number of small public school buildings. The new water-works are extensive; the streets are macadamized and well lighted. The prosperity of Harrisburg is due chiefly to its facilities for communication with the coal and iron districts of the State; the Cumberland Valley, Northern Central Pennsylvania, Philadelphia and Reading, and the Vanderbilt or Southern Pennsylvania railroads, all centering here, to which the facilities afforded by the Pennsylvania canal with its outlets may be added. As a result of the resources it has large and important manufacturing establishments of iron, steel, boilers, galvanized iron cornices, brick, and tile. Harrisburg is also an important depot for lumber via the Susquehanna River, and has extensive saw and planing establishments. For history, description of capitol building, etc., see Britannica, Vol. XI, p. 494. Population in 1880, 30,762; in 1890, 40,164.

HARRISON, a post-village of Hamilton county, Ohio, 25 miles northwest of Cincinnati. It contains tanneries, flour-mills, brush factories, corn-drill factory, railroad shops, woolen and furniture factories. Pop. (1890), 2,010.

HARRISON, BENJAMIN (1740-1791), a signer of the Declaration of Independence. In 1773 he was a member of the committee of correspondence which united the colonies against Great Britain, and was five times elected to a seat in Congress. He was governor of Virginia in 1782-85, and at the time of his death was a member of the legislature.

HARRISON, BENJAMIN, the twenty-third President of the United States, great-grandson of the preceding, born in North Bend, Ohio, Aug. 20, 1833. He graduated in 1852 from Miami University, and studied law in Cincinnati. In 1854 he removed to Indianapolis, Ind., and gained a large legal practice. In 1862 he entered the United States army, and served with conspicuous gallantry in the Atlanta campaign, returning to civil life at the close of the war with the rank of brevet brigadier-general. In 1876 he was the Republican candidate for governor of Indiana, and in 1881 was chosen to the United States Senate for six years. In 1888 he was nominated on the Republican ticket for President of the United States, with Levi P. Morton for Vice-President. The election resulted in favor of Mr. Harrison, who received 233 electoral votes to 168 for Grover Cleveland, the Democratic nominee. In 1892 President Harrison was again the nominee of his party, with Mr. Whitelaw Reid on the ticket for vice-president, but this time he encountered an overwhelming defeat from the same rival, now President Cleveland.

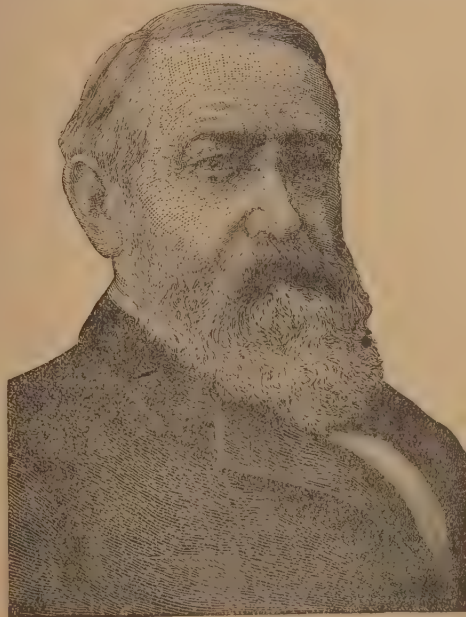
HARRODSBURG, a town and the county-seat of Mercer county, Ky., said to be the oldest town in the State. It enjoys a reputation for its mineral waters; is the seat of Daughters' College; has a variety of manufacturing establishments, and car-

ries on an important trade in horses, cattle and other live stock. Pop. (1890), 3,230.

HART, the name given to the stag or male deer from the age of six years, when the crown or sur-royal antler begins to appear.

HART, JOEL T., sculptor, born in Clark county, Ky., 1810; died in Italy, 1877. In 1847 Hart went to Italy for study, and while there modeled a statue of Henry Clay, which is at the present time in Richmond, Va. This was followed by a large bronze statue and also a marble statue of the same statesman. During his thirty years' residence in Florence, Hart completed many busts and statues. Of original compositions, his *Charity*, *Woman Triumphant*, and *Penserosa* are among the best.

HART, JOHN (1708-80), a signer of the Declaration of Independence. He served in the provincial legislature for several years, and was a member of the Congresses of 1774, '75, and '76. In 1777-78 he was chairman of the New Jersey council of safety, and when the State was invaded by the British his farm and stock were destroyed and he had to fly with his family to the forest. After peace was restored he returned to his farm and passed the remainder of his days in agricultural pursuits.



BENJAMIN HARRISON.

HART, JOHN SEELY (1810-77), an American author. In 1832 he became tutor in Princeton College, and in 1834 adjunct professor of ancient languages. From 1836 to 1841 he had charge of the Edgehill School; from 1842 to 1859 he was principal of the Philadelphia high-school; from 1863 to 1871 of the State Normal School of New Jersey, and in 1872 became professor of rhetoric and the English language at Princeton.

HART, SOLOMON ALEXANDER, painter, was born at Plymouth, in April, 1806, the son of a Jewish goldsmith, who in 1820 removed to London. Apprenticed first to a line engraver, in 1823 young Hart became a student at the Royal Academy. Amongst his works are *The Elevation of the Law*,

Isaac of York, English Nobility Receiving the Communion, Henry I. Receiving Intelligence of the Death of his Son, Milton Visiting Galileo in Prison, The Three Inventors of Printing. He also painted miniatures and portraits. In 1840 Hart became R.A., in 1854 professor of painting, and in 1865 librarian of the Royal Academy. He died in London, June 11, 1881.

HARTE, FRANCIS BRET, an American author, born in 1839. After a connection as editor with various California newspapers, he was appointed, in 1864, secretary of the United States branch mint, holding the position for six years. In 1868 he began the publication of *The Overland Monthly*, and about this time became widely known as an author. In 1871 he settled in New York City; from 1878 to 1880 he was United States consul at Crefeld, Germany, and from 1880 to 1885 consul at Glasgow, Scotland.

HARTFORD, a city of Connecticut, sole capital of the State since 1873, and county-seat of Hartford county. For an account of the site, history and government of Hartford, see *Britannica*, Vol. XI, pp. 496-497. The population in 1890 was 53,182, being an increase of 11,167 during the decade, and there had been a corresponding increase in the business and wealth of the city, resulting in the erection of new buildings and the improvement of old ones, and the display of business enterprise. A board of trade has been organized. It held its third annual meeting on Jan. 1, 1891, and has a fine building in process of erection. Hartford Theological Seminary has laid the foundation of the Case Memorial Library. The new buildings of Trinity College are, to some extent, a reproduction of those of Trinity College in Glenalmond, Perthshire, Scotland; the new post-office building was completed in 1883 and the county court-house in 1884, and many of the insurance companies and banks have very fine and substantial edifices. There are fifteen miles of street railway, and seven railroads enter the city.

HARTFORD CITY, the county-seat of Blackford county, Ind., 40 miles south of Fort Wayne. It contains a hub and spoke factory, a heading-factory, flour-mill, and a stove factory. Pop., 2,287.

HARTFORD CONVENTION, in the political history of the United States, was an assemblage of delegates from the New England States, at Hartford, Connecticut, December 15, 1814. The war with Great Britain in 1812-14 had been from the first opposed by the majority of the people of New England, who were Federalists, and looked upon the war as a mere party measure of the Democrats; and, in face of the destruction of the commerce and the fisheries, the chief interests of New England, this convention was called with the ostensible object of devising means of security and defense. It sat twenty days with closed doors, and, as it was supposed to be of a treasonable character, it was watched by a military officer of the government. The convention prepared a report recommending the adoption of measures by the state legislatures that would protect their citizens from conscriptions and impressments, and the militia from forcible drafts; the report also proposed certain amendments to the federal constitution. No treasonable act was committed, and no treasonable intention proved; yet the suspicion of disloyal tendencies clung to the convention, and completed the ruin of the Federalist party, which did not survive the election of 1816.

HARTINGTON, SPENCER COMPTON CAVENDISH, MARQUIS OF, born July 23, 1833, and graduated at Trinity College, Cambridge, in 1854. He entered Parliament in 1857, being first returned for North Lancashire, in 1869 for the Radnor boroughs, in 1880 for Northeast Lancashire, and in 1885 for the Ros-

sendale division of that county. Between 1863 and 1874 he held office as a lord of the admiralty, under-secretary for war, war secretary, postmaster-general, and, from 1871, chief secretary for Ireland. On Mr. Gladstone's temporary abdication, in February, 1875, he was chosen leader of the Liberal opposition, and in the spring of 1880, on the downfall of the Beaconsfield administration, was invited by the queen to form a ministry. He rejected the offer, and served under Mr. Gladstone, first as secretary of state for India, and then as war secretary from 1883 to 1885. But he wholly dissented from Mr. Gladstone's scheme of Irish Home Rule, and since 1886, as head of the Liberal Unionists, has stubbornly opposed it. In December, 1891, he succeeded his father as duke of Devonshire.

HARTMANN, ALFRED, a Swiss author, was born Jan. 1, 1814, near Langenthal, in the Canton of Bern, and attended from 1827 to 1831 the schools of Solothurn. After the latter date he studied law in the universities of Munich, Heidelberg, and Berlin. During a prolonged visit to Paris, however, he lost all taste for jurisprudence, and devoted himself to literary pursuits. On returning to his native country he permanently fixed his residence at Solothurn, where he formed a close friendship with the well-known painter Disteli, and where (from 1845) he published a comic periodical called *Postheiri*. But Hartmann became best known through his Helvetic romance, *Meister Putsch und seine Gesellen*, 1858; and, in the department of biography, by his sketch of his friend *Martin Disteli*, 1861; *H. J. Von Staal*, 1861; and *Hory, Kanzler-Denkwürdigkeiten*, 1876. Among his other works may be mentioned, *Junker und Bürger*, 1865; *Schweizernovellen*, 1877; *Neue Schweizernovellen*, and *Fortunat*, 1879.

HARTMANN, EDUARD VON, philosopher, was born in Berlin, in 1842. He entered the Prussian army in 1858; but lameness obliged him to leave the service in 1865, and he took to literature as a profession. His first work, *Philosophie des Unbewussten* (*The Philosophy of the Unconscious*), at once raised him to fame. It was published in 1869, and in 13 years passed through nine editions. An English translation, in three volumes, is published in Trübner's *English and Foreign Philosophical Library*. This has been followed by numerous important works.

HARTMANFT, JOHN FREDERICK (1830-89), an American soldier. In 1859 he was admitted to the bar, and at the beginning of the civil war organized the 4th Pennsylvania regiment. He commanded it during the three months of its enlistment, and then organized the 51st Pennsylvania regiment, becoming its colonel. He was present at the battles of Fredericksburg, Campbell's Station, Knoxville, Vicksburg, the Wilderness, and Spottsylvania, and in 1864 was made brigadier-general of volunteers. The following year he was brevetted major-general. In 1865 he was made auditor-general of Pennsylvania, and reelected in 1868. From 1872 to 1878 he was governor of the State. He became postmaster of Philadelphia in 1879, and in 1880 collector of the port of that city.

HART'S FALLS, a village of Rensselaer county, N. Y., situated on the Hoosac River, near its mouth, and on the Boston, Hoosac Tunnel and Western and the Troy and Boston Railroads. It contains paper and woolen mills, and has manufactories of cassimeres, gunny-cloth, and twine. It was formerly called Schaghticoke Point. Pop., 1,253.

HARTSHORNE, EDWARD (1818-85), an American physician, son of Dr. Joseph Hartshorne. He graduated in medicine at the University of Penn-

sylvania in 1840, and eight years later began practice in Philadelphia. For a time he was a surgeon in Will's Eye Hospital and afterwards in the Pennsylvania hospital. During the war he served as consulting surgeon in the United States Army hospitals and in connection with the United States sanitary commission. He is the author of *Separate System*; notes to Taylor's *Medical Jurisprudence* (1854); and *Ophthalmic Medicine and Surgery* (1856).

HARTSHORNE, HENRY, an American physician, born in 1823. He graduated in the medical department of the University of Pennsylvania in 1845. In 1859 he became professor of the practice of medicine, and in 1865 of hygiene, in the University of Pennsylvania. In 1867 he was given the chair of organic science and philosophy in Haverford College. He has also been a professor in the Pennsylvania College of Dental Surgery, in Girard College, and in the Woman's Medical College of Pennsylvania.

HARTSHORNE, JOSEPH (1779-1850), an American physician. He graduated in medicine at the University of Pennsylvania in 1805, and after two years of travel settled in Philadelphia. From 1815 to 1821 he was surgeon of the Pennsylvania Hospital.

HART'S-TONGUE (*Scolopendrium*), a genus of widely distributed ferns, of which one species, *S. vulgare*, is a native of Britain, and is common in moist woods, on shady banks, in caves on the seashore, and other cold and damp situations. Its fronds are in general undivided, although sometimes forked, and from a few inches to 2 feet in length and from 1 to 3 inches in breadth. The sori are in transverse lines on the lateral veins. Fine plants of this fern are ornamental, and are most luxuriant in winter.

HART, CHARLES FREDERICK, born in New Brunswick, August 23, 1840; died in Brazil, March, 1878. By the invitation of Louis Agassiz he entered the Museum of Comparative Anatomy at Cambridge, Mass. Later he became professor of natural history at Vassar College, and was afterward professor of geology and physical geography in Cornell. He made several exploring trips in the valley of the Amazon, and when on one of these he died.

HARTZENBUSCH, JUAN EUGENIO, a Spanish dramatic poet, born of German parentage, in Madrid, Sept. 6, 1806, died there August 3, 1880. He was intended for the church, and was educated by the Jesuits, but his liking for the drama led him to devote himself to literature. During the greater part of his life he was employed in the National Library at Madrid, of which he became director in 1862.

HARUGARI, a German order established in the United States in 1847. This organization comprises several hundred subordinate lodges, combined into State lodges, and these again into one national lodge. The aims of the order are principally benevolent and social.

HARVARD, a thriving village of McHenry county, Ill., 63 miles northwest of Chicago. It is a railroad junction, has several elevators, railroad repair shops, and manufactories of farm machinery and carriages. Pop. (1890), 1,967.

HARVARD COLLEGE. See COLLEGES, in these Revisions and Additions.

HARVARD, JOHN (1607-38), an American philanthropist, born in England. He sailed for America in 1637, and the same year was made a freeman of Massachusetts. In 1638 a tract of land in Charlestown was deeded to him, where he exercised his ministerial functions. At the time of his death his property was worth £1,500, one half of which he

left for the erection of the college which bears his name. He also gave a library of 320 volumes. See Britannica, Vol. XI, p. 500.

HARWICH, a village of Barnstable county, Mass., on the south side of Cape Cod. It carries on a good fishing and coasting trade.

HASE, KARL AUGUST, a German theologian, born at Steinbach, in Saxony, Aug. 25, 1800, died Jan. 3, 1890. Expelled from Erlangen University for his connection with the political students' unions, he became in 1823 a university tutor at Tübingen, but, as the result of another investigation was afterwards imprisoned for ten months. In 1829 he settled at Leipzig, and in the following year was called to Jena as professor of theology. Here he remained till his retirement in 1883, when he was ennobled and appointed a privy councillor.

HASE, KARL BENEDICT, a German philologist, born near Weimar in 1780, died at Paris, March 21, 1864. After studying philosophy and theology at Jena, he went to Paris, and obtained a position in the Imperial Library in 1805. In 1816 he became professor of Greek palæography and of modern Greek at the *École des Langues Orientales*; in 1830 professor of the German language and literature at the Polytechnic School; in 1832 keeper of manuscripts in the Imperial Library; and in 1852 professor of comparative grammar in the University of Paris.

HASHISH, from which the word *assassin* is derived, is an Arabian preparation of Indian hemp, known in India as *bang* or *siddhi*. It consists chiefly of the leaves and stalks of *Cannabis indica*. The drug is used in the East in various ways. Sometime it is smoked alone or with tobacco. At other times beverages are prepared from it, or it is taken in the form of lozenges or electuaries. The *majoon* of Calcutta, the *mapouchari* of Cairo, and the *dawames* or *dawamesc* of the Arabs are preparations of this kind. The effects differ according to the dose and the idiosyncrasy of the individual. Some become pugnacious, while others fall into a state of reverie. After small doses there is a great tendency to causeless merriment. In most cases there is an extraordinary susceptibility to hallucinations of various kinds.

HASSLER, FERDINAND RUDOLPH (1770-1843), an American surveyor. In 1807-10 he was professor of mathematics in the United States Military Academy, and in 1810-11 occupied a similar position in Union College. He then became first superintendent of the United States coast survey, and was sent to Europe to procure instruments, but was detained in England till 1815 as an alien enemy. In 1818 the work was discontinued and not resumed until 1832. From this time until his death he was at the head of the survey.

HASTINGS, according to the French chroniclers, the name of a viking or sea rover of the 9th century. The shores and cities of France, Spain, Portugal, and Italy are said to have been repeatedly wasted and burned by him and his savage comrades.

HASTINGS, a city and county-seat of Barry county, Mich., on Thornapple River, 32 miles southeast of Grand Rapids. It has a foundry and flouring-mills. Pop. (1890), 2,972.

HASTINGS, a city and county-seat of Dakota county, Minn., on the west bank of the Mississippi River. Carriages, furniture, and flour are manufactured, and the city contains grain elevators, saw mills, and is a wheat and lumber market. Pop. (1890), 3,705.

HASTINGS, a city and county-seat of Adams county, Neb. With the recent rapid growth in population there has been a corresponding growth in

all the important institutions of the city. A land company has been organized. Since 1886 railroad facilities have increased, five roads, with eleven outlets, connecting the city with all parts of the country. Street railway lines have increased to 18 miles. The streets are well paved and lighted. The public buildings are the court house, city hall, opera house, Masonic temple, State asylum for the insane, city hospital, Hastings College (Presbyterian), and Academy (Roman Catholic), and Young Men's Christian Association. There are six fine public school buildings, public library, three daily and four weekly papers, four national banks, one private bank and a loaning company. The water plant is owned by the city. There is a good police force and fire department, also free mail delivery. There are five extensive brick-yards, two flour mills, six lumber yards, two foundries, three sash and door factories, a cold-storage plant and a packing-house. There are thirty-one jobbing houses, and the wholesale trade in 1890 amounted to \$1,250,000. Population in 1880, 4,500; 1890, 13,793.

HASWELL, CHARLES HAYNES, an American civil engineer, born in 1809. In 1836 he was appointed chief engineer of the United States navy, and was a member of the board that designed the steam frigates *Missouri* and *Mississippi*. In 1844 he was appointed engineer-in-chief of the engineer corps, and held the position till 1850, when he left the service.

HATCH, EDWIN, a learned theologian, born at Derby, September 4, 1835. He was educated at King Edward's School, Birmingham, and at Pembroke College, Oxford, and took a second-class in classics in 1857. After some years of teaching as professor of classics at Trinity College, Toronto, and rector of Quebec High School, he returned to Oxford as vice-principal of St. Mary Hall in 1867, a post which he held till his resignation in 1885. He was appointed rector of Purligh, Essex, in 1883, and next year reader in ecclesiastical history at Oxford. The Grinfield lectureship on the Septuagint he held from 1880 to 1884.

HATTON, JOSEPH, born at Andover, England, in 1839; began to write at an early age. He has edited several provincial and London newspapers. In 1865 his first novel, *Bitter Sweets*, a love story, appeared in three volumes and in the following year, *Against the Stream*. This was followed in 1867, by *The Talents of Barton*. In 1868 he was appointed editor of the *Gentleman's Magazine*, which post he held for six years. He has published several novels, and has also occupied himself with adapting plays and stories for the stage.

HATZFELDT, COUNT VON, was born in 1831. His mother was the Countess Sophie von Hatzfeldt, the patroness and companion of Ferdinand Lassalle, the Jew philosopher and social democrat. In 1862 Count Hatzfeldt went to Paris with Prince Bismarck as one of his secretaries, and on the outbreak of the Franco-German war he was one of the select workers who formed the chancellor's diplomatic suite. In 1874 he was appointed imperial minister at Madrid. Soon after the signing of the treaty of Berlin he was sent to Constantinople. After a three years' residence at Stamboul he was recalled to Berlin to succeed Herr von Bülow as foreign secretary. In November, 1885, he was sent as German ambassador to London.

HAUPT, HERMAN, an American engineer, born in 1817. From 1835 to 1839 he was assistant engineer on the public works of Pennsylvania, and from 1844 to 1847 was professor of civil engineering and mathematics in Pennsylvania College. In the latter year he became principal engineer of the

Philadelphia and Columbia Railroad; was made superintendent in 1849; and from 1856 to 1861 was chief engineer of the Hoosac Tunnel in Massachusetts. He served in the civil war as aid to Gen. Irwin McDowell and chief of the bureau of United States military railways. Since 1875 he has been chief engineer of the Tide-water Pipe Line Company. Col. Haupt is the author of *Hints on Bridge-building* (1840); *General Theory of Bridge Construction* (1852); *Plan for Improvement of the Ohio River* (1855); and *Military Bridges* (1864).

HAUPUR, HAPOUR, or HAPUR, a town of India, in the northwest provinces, eighteen miles south of Meerut. The western portion is substantially built, and the streets metaled and drained; the eastern half resembles a large agricultural village, full of cattle. A famous government stud was formerly maintained here. Population, 14,294.

HAUSSMANN, GEORGE EUGÈNE, BARON, a French administrator, born in Paris, March 27, 1809, died there Jan. 12, 1891. Entering the public service under Louis Philippe he distinguished himself in various parts of France, and under Napoleon III., in 1853, rose to be prefect of the Seine. He then commenced his great work of improving and embellishing Paris, which continued until 1870 and imposed a financial burden of \$175,000,000. He was made baron and senator in recognition of his services. There was, however, much dissatisfaction with his enormous expenditures, and the charges of mismanagement being freely made he was dismissed from office in 1870. The following year he was appointed director of the *Crédit Mobilier*, and in 1881 was elected a member of the chamber of deputies. "Haussmannizing" has become a popular term for the destruction of ancient landmarks to make way for improvements.

HAVANA, a post-village and county-seat of Mason county, Ill., situated on the east bank of the Illinois River opposite the mouth of the Spoon River. It is a railroad junction, and has various public buildings and factories. Pop. 1890, 2,525.

HAVANA, a village of Schuyler county, N. Y., at the head of Seneca Lake, eighteen miles from Elmira. It contains machine shops, potteries, and mills, where flour, plaster, and woolen goods are made. Pop. (1890), 1,751.

HAVELOCK, SIR ARTHUR ELIBANK, K. C. M. G., the present governor of Ceylon, born in 1844. In 1877 he was appointed president of Nevis, a beautiful island of the Antilles, with Charlestown as capital, and two years later he became the chief civil commissioner of the Seychelles. His next promotion was in 1881 to the governorship of the West African settlements. In 1885 he became governor of Natal; after he had been created K. C. M. G., he was appointed to the governorship of Ceylon, in March, 1890.

HAVEN, ALICE BRADLEY, an American author, born in Hudson, N. Y., in 1823, died at Mamaroneck, N. Y., in 1863. She wrote sketches for various papers until 1847, when she took editorial charge of the Philadelphia "Saturday Gazette," on the death of her husband, Joseph C. Neal, its editor, her pen-name being "Cousin Alice." She conducted this journal for several years, contributing at the same time to other periodicals. In 1853 she married Samuel L. Haven.

HAVEN, ERASTUS OTIS, an American M. E. bishop, born in Boston, Mass., in 1820, died in Salem, Oregon, in 1881. In 1848 he entered the Methodist ministry in the New York conference, and in 1853 became professor of Latin in Michigan University. From 1856 to 1863 he was editor of the Boston "Zion's Herald," during which time he

served two terms in the Massachusetts Senate. In 1863 he became president of Michigan University; in 1869 of Northwestern University, Evanston, Ill.; in 1872 was made secretary of the M. E. board of education; and from 1874 to 1880 he was chancellor of Syracuse University, N. Y. In the latter year he was ordained a bishop. He published *American Progress; The Young Man Advised* (1855); and *Pillars of Truth* (1866).

HAVEN, GILBERT (1821-80), an American M. E. bishop. In 1846 he became a teacher in Amenia Seminary, N. Y., and in 1851 a member of the New England conference. For the next nine years he preached in churches in Massachusetts, and then traveled in Europe, Palestine, Egypt and Greece. In 1867 he became editor of the Boston "Zion's Herald," and in 1872 was ordained bishop. He is the author of *The Pilgrim's Wallet, or Sketches of Travel in England, France and Germany; National Sermons; Life of Father Taylor, the Sailor Preacher* (1871); and *Our Next Door Neighbor, or a Winter in Mexico* (1875).

HAVEN, JOSEPH (1816-74), an American Congregational clergyman. In 1839 he was ordained pastor of the Congregational church at Ashland, Mass., and from 1846 to 1850 had charge of the Harvard church, Brookline. In 1850 he was made professor of mental and moral philosophy in Amherst College, and in 1853 of systematic theology in the Chicago Theological Seminary. He then traveled in Germany, Palestine and Egypt, and from 1873 until his death was professor of mental and moral philosophy in Chicago University. He published *Mental Philosophy* (1857); *Moral Philosophy* (1859); *Studies in Philosophy and Theology* (1869); and *Systematic Divinity* (published posthumously, 1875).

HAVER, a term used in Scotch law to denote the person in whose custody a document is.

HAVERFORD COLLEGE. See COLLEGES, in these Revisions and Additions.

HAVERGAL, FRANCES RIDLEY, an English writer, born at Astley, Worcestershire, in 1836, died at Caswell Bay, near Swansea, Wales, June 3, 1879. She displayed great talents as a singer, pianist and organist while a child. When grown up she wrote to give expression to her strong religious feelings. Among her many published books, which are all of a devotional character, we mention: *Little Pillows; The Ministry of Song; Morning Bells; Our Work and Our Blessings; Under His Shadow; My King; Kept for the Master's Use; and Swiss Letters* (1882). They are partly in prose and partly in verse.

HAVERHILL, a city of Essex county, Mass., pleasantly situated on the Merrimac River, 18 miles from its mouth, and connected with Boston by the Boston and Maine Railroad. The principal industry is the manufacture of fine boots and shoes, in the production of which the city ranks third in the country. In February, 1882, a large part of the business portion of the city was destroyed by fire, involving a loss of nearly \$2,000,000. Rebuilding was promptly begun. See *Britannica*, Vol. XI, pp. 526-27. Population in 1880, 18,472; in 1890, 27,322.

HAVERHILL, a village and one of the county-seats of Grafton county, N. H., located on the east bank of the Connecticut River. In the township, leather, lumber, whetstones, paper, starch and boxes are made. Pop. (1890), 2,545.

HAVERSTRAW, a post-village and railroad junction of Rockland county, N. Y., situated on the Hudson River, 38 miles from New York City. It has a paper mill, large print works, a rolling mill for copper, and engages extensively in the manufacture of brick. Pop. (1890), 5,170.

HAVIDLAR, highest rank of non-commissioned officer among native troops in India and Ceylon.

HAVRE DE GRACE, a village of Harford county, Md., on the south bank of the Susquehanna River. It has a fine harbor, ship-yards, a trade in lumber and coal, flour mills, fruit-canning factories, and extensive fisheries. The famous canvas-back ducks are obtained in the vicinity. Pop. (1890), 3,244.

HAWAIIAN ISLANDS, a group of 12 islands (8 inhabited and 4 uninhabited) in the North Pacific Ocean. Area, as officially stated in 1891, 6,640 square miles. Population, 80,578. Capital, Honolulu (on the southwest coast of Oahu), with a population of 20,487. For the history, government, productions and early statistics, see *Britannica*, Vol. XI, pp. 528-32.

In 1843 the independence of the Hawaiian government was formally guaranteed by the English and French governments. Kamehameha III. was succeeded by Kamehameha IV. in 1854. He was succeeded by his brother in 1863. When Kamehameha V. died in 1872 it ended the line of the Kamehamehas and a chief named Luñailo was elected to the throne. He died in 1874 and another chief, Kalakaua, was elected. In 1886 the unsatisfactory state of the public finances demanded a change in the system, and a new constitution was adopted in the following year. Under it the members of both houses of parliament are elected by the vote of all the adult male subjects, under the provisions of an educational qualification on suffrage, and, in the case of the house of nobles, a property qualification. The judiciary power is lodged in a supreme court, composed of a chief justice, who is also a chancellor, and at least two judges, district courts, police, and other tribunals.

King Kalakaua died at the Palace Hotel in San Francisco, Jan. 20, 1891, of Bright's disease. His visit to this country was on account of his health. King Kalakaua was a great traveler. He visited this country in 1876 and visited most of the principal cities. It was his travels and extravagance that caused the financial troubles that led to a change in the form of government. Princess Liliuokalani succeeded her brother and has since been the Queen of the Hawaiians. Her husband is an Englishman.

Liliuokalani has proved herself to be an erratic and self-willed ruler. She has constantly been at variance with her legislature and advisers, and in January, 1893, attempted to promulgate a new constitution, depriving foreigners of the right of franchise and abrogating the existing house of nobles, at the same time giving herself power of appointing a new house. This was resisted by the foreign element of the community, who at once appointed a committee of safety, consisting of thirteen members, who called a mass meeting of their class, at which 1,200 or 1,500 were present.

That meeting unanimously adopted resolutions condemning the action of the queen and authorizing a committee to take into further consideration whatever was necessary to protect the public safety. The committee issued a proclamation to the Hawaiian people, formed itself into a provisional government, took possession of the national property, and sent commissioners to the United States inviting this Republic to annex the Hawaiian Islands. A treaty to that end was proposed by President Harrison in February, 1893.

The naval and military forces consisted of 250 men, authorized by law, and a volunteer force—the Honolulu Rifles—of 250 men. All natives are liable to serve if called on.

AREA OF THE ISLANDS AND MOVEMENT OF POPULATION.—The areas of the island groups are as follows: Hawaii, 4,210 square miles; Maui, 760; Oahu, 600.

Kauai, 590; Molokai, 270; Lanai, 150; Niihau, 97; Kahoowe, 63.

According to the census in 1884, the population was 80,578—51,539 males, and 29,039 females; and according to the census of 1890, 89,990—58,714 males, and 31,275 females. Of the population in 1890, 34,436 were natives, 6,186 half-castes, 7,495 born in Hawaii of foreign parents, 15,301 Chinese, 12,360 Japanese, 8,602 Portuguese, 1,928 Americans, 1,344 British, 1,034 Germans, 227 Norwegians, 70 French, 588 Polynesians, and 419 other foreigners. The native population is closely allied to the Maoris of New Zealand. At the time of Captain Cook's discovery of the islands, upwards of a century ago, the population numbered probably 200,000. Since then the natives have rapidly decreased, and since the census of 1884 there has been a decrease in the native population of 5,578. The foreign element is, however, rapidly increasing. The total arrivals in 1883 were 11,194; departures, 3,535; the immigration in 1884, was 7,654, and emigration 4,941; in 1885 the former, 5,410, and the latter, 1,805; in 1886 there were 3,725 arrivals and 2,189 departures; in 1887, arrivals 3,250, departures 2,220; in 1888, 5,532 arrivals, 2,890 departures; in 1889, 3,671 arrivals, 2,313 departures; in 1890, 2,484 arrivals, 1,852 departures; excess of arrivals 632. Most of the immigrants are Chinese and Japanese. The capital, Honolulu (20,487 inhabitants), is in the island of Oahu.

All forms of religion are permitted and protected. Nearly all the natives are Christians. The sovereign belongs to the Presbyterian Church. There is a Church of England, of which there is a bishop at Honolulu; there is a Roman Catholic bishop, and ministers of various denominations. According to latest statistics there are 29,685 Protestants, 20,072 Roman Catholics, 72 Jews, 3,576 Mormons, 30,821 undesignated. Schools are established all over the islands, the sum allotted for public instruction in 1890-92 being \$326,922. In 1890 there were 178 schools, with 10,000 pupils; of the pupils, 5,559 were Hawaiians and 1,573 half-castes.

The estimated revenue of Hawaii for 1890-92 was \$2,862,505; expenditure, \$2,853,116. The revenue is largely derived from customs (\$1,082,766 in 1888-90) and internal taxes (\$901,803 in 1888-90), while the largest item of expenditure for the interior was \$1,180,125, (1888-90). The debt on March 31, 1890, was \$2,599,502. The interest varies from 5 to 7 per cent.

The islands are to a great extent mountainous and volcanic, but the soil is highly fertile and productive. Sugar and rice are the staple productions, while coffee, hides, bananas and wool are also exported.

Of the reports of 1890, sugar was valued at \$12,159,585 (259,000,000 lbs.); rice, \$545,239; bananas, \$176,351; hides, \$70,949; the imports are mainly groceries and provisions, clothing, grain, timber, machinery, hardware, cotton goods. Ninety-one per cent. of the trade is with the United States.

Steamers connect the islands with the American continent, Australasia, and China. In the inter-island traffic, 20 steamers and 28 sailing vessels are constantly engaged. In 1889 there were 59 vessels belonging to the islands, of 15,403 tons. There are about 56 miles of railway in the islands of Hawaii, Maui, and Oahu. There are telegraphs in the islands of Maui, Hawaii, between Hawaii and Oahu, and around the latter island; total length, 250 miles; nearly every family in Honolulu has its telephone. In the two years, April 1, 1888, to March 31, 1890, the total number of letters, etc., transmitted and received by the post-office was 3,159,034; there were 54 post-offices. Postal savings banks, 1890: depositors, 2641; amount, \$956,999. Honolulu is lighted by electricity and has lines of tramways. The

various islands will shortly be connected by telegraphic cable.

HAWARDEN (pronounced *Harden*), a small market-town of Flintshire, North Wales, seven miles west of Chester. The church, almost destroyed by fire in 1857, was restored from designs by Sir G. G. Scott. A free library was opened in 1889. Hawarden Castle, the seat of the Right Hon. W. E. Gladstone, dates from 1752. The park contains the ruined circular keep of a 13th-century castle, which commands a good view of the valley of the Dee.

HAWELS, HUGH REGINALD, an English clergyman and author, born at Egham, Surrey, in 1838. He received his education at Trinity College, Cambridge, and graduated in 1859. After being curate of some London churches for six years he was appointed incumbent of St. James Church, Marylebone, in 1866. He took a great interest in the welfare of the lower classes, diffused knowledge among them by his *Penny Readings*, and advocated the opening of the museums on Sundays. In 1868 Hawels was made editor of "Cassell's Family Magazine," and in 1885 he visited the United States.

HAWES, JOEL (1789-1867), an American Congregational clergyman. In 1818 he was ordained pastor of the first Congregational church in Hartford, Conn., and was sole pastor until 1860, senior pastor until 1864, and pastor *emeritus* until his death.

HAWESVILLE, the county-seat of Hancock county, Ky., on the Ohio River. Tobacco-raising and coal-mining are the chief occupations. This village is in the center of the Kentucky coal-beds, and eight mines are in operation. Pop. (1890), 1,013.

HAWKBIT, the *Leontodon autumnale*, or fall dandelion, a plant of weedy aspect, belonging to the natural order *Compositæ*, closely related to and formerly included with the dandelion, from which it has been separated on account of its feathery pappus. The name is due to the deep, tooth-like lacerations of the leaves. The species are natives of Europe, but are naturalized in parts of the United States.

HAWKERS, also called PEDDLERS, or, in England, petty chapmen, persons who go from town to town, or door to door, selling goods or merchandise, or exercising their skill in handicraft. In the United States hawkers are generally required to take out licenses under the local laws of the several States. In some States and Territories, as Florida and Arizona, and in the District of Columbia, commercial travelers must pay a license-fee of from twenty-five to two hundred dollars; while in Pennsylvania it is a great misdemeanor to sell goods unless the agent or his principal be a tax-payer of the State. But in many States no such law has ever been enacted; and in others, as in Montana and Nevada, similar acts, although on the statute-book, are held to be unconstitutional, and are not enforced. In England hawkers who use beasts of burden, and hawkers who go from place to place, hiring rooms or booths for the exhibition of their wares, are by the hawkers' act, 1888, required to take out an annual or half-yearly license from the excise, which is valid all over the kingdom.

HAWKE'S BAY, a provincial district of New Zealand, on the east coast, between Auckland and Wellington. Area, 4,765 square miles; population, 24,568. It presents rich alluvial plains and undulating hills, with enormous forests. The bay known as Hawke's Bay was first entered by Captain Cook on October 8, 1769, and was so named after Sir Edward Hawke, then first lord of the admiralty. It is almost all suitable for farming, and the forests are of enormous extent. Napier is the port and chief city.

HAWKSBEARD (*Crepis*), a genus of annual and biennial plants belonging to the natural order Compositae, so closely related to Hawkweed (*Hieracium*) that some of the species are referred to the one genus or the other according to the peculiar views of individual botanists. The species are widely distributed through Europe and Asia. Doubtful medicinal properties have been ascribed to several species, and *C. lacera*, a native of the Apennines, is said to be poisonous.

HAWKESBURY, a river of New South Wales, which rises in the Cullarin range, and under the names of Wollondilly and Nepean flows northeast; then turns as the Hawkesbury southeast, and enters the Pacific at Broken bay, about twenty miles northeast of Sydney. Its length is 330 miles, and it is navigable for vessels of one hundred tons as high as Windsor. The Hawkesbury is crossed by a steel girder bridge (1886-89) on the railway between Sydney and Newcastle. This bridge is one of the largest structures of its kind in the world, and completes the system of railway communication between Brisbane and Adelaide.

HAWKESBURY, a Canadian lumbering village of Prescott county, Ont., situated on the Ottawa River, across from Grenville.

HAWKINSVILLE, a city and county-seat of Pulaski county, Ga., 40 miles south of Macon. It has cotton ware houses, grist mill, and manufactures carriages, wagons, and cotton goods. Pop. 1,755.

HAWKS, FRANCIS LISTER (1798-1866), an American Episcopal clergyman. In 1819 he was admitted to the North Carolina bar, but after a few years of marked success in the practice of law took up the study of theology, and was ordained deacon in 1827, and priest shortly afterward. In 1829 he became assistant rector of Trinity church, New Haven, Conn., and the same year at St. James's, Philadelphia. In 1830 he was made professor of divinity in Trinity College, and in 1831 became rector of St. Stephen's church, New York. From December of 1831 to 1843 he was rector of St. Thomas's, New York, and from 1845 to 1849 of Christ church, New Orleans. In the latter year he returned to New York, and became rector of Calvary church. In 1862 he resigned and went to Baltimore, where he became rector of Christ church, but in 1865 returned to New York. He was the author of many important works on legal, ecclesiastical, and other subjects.

HAWKSBEER, or **HAWKSBERE**, FRANCIS, English natural philosopher, born in the latter half of the 17th century, and died about 1730. He was admitted a fellow of the Royal Society in 1705, and appointed curator of experiments to the society, and in 1723 was elected assistant secretary. He carried further the tentative observations by Dr. Gilbert and Boyle (see *Britannica*, Vol. VIII, pp. 3-4) on the subject of electricity, and by his experiments laid the scientific foundations of that branch of knowledge. He contributed forty-three memoirs to the "Philosophical Transactions," chiefly on chemistry and electricity, between 1704 and 1713. His chief independent work, published in 1709, was entitled *Physico-Mechanical Experiments on Various Subjects*. He is also well known as the improver of the earlier air-pumps of Boyle, Papin, and Hooke, and as the first who used glass in the electrical machine.

HAWLEY, a village of Wayne county, Pa., situated on the Lackawaxen River, eight miles southeast of Honesdale. It is a railroad junction, and has a large business in the transfer and forwarding of coal. Pop. (1890), 1,968.

HAWLEY, JOSEPH ROSWELL, a United States Senator, born in 1826. He was admitted to the

Connecticut bar in 1850, and in 1857 became editor of the Hartford "Evening Press," which was consolidated with the "Courant," of which he is editor, in 1867. He enlisted in the Union army as a lieutenant in 1861; became brigadier and brevet major-general, and in 1866 was mustered out. In April of the same year he was chosen governor of Connecticut, and in 1872 was made a member of Congress. In 1881 he took his seat as a United States Senator, and was reelected in 1887 and 1893. His term of service expires March 3, 1899.

HAWSE (akin to *heel*, *hals*, "the neck"), part of a vessel's bow, in which the hawse-holes are cut. Through the hawse-holes the cables pass which hold the vessel when she is moored with two anchors out forward—one on the starboard, the other on the port bow. *Hawser* is a small cable or a large rope.

HAWTHORNE, JULIAN, an American author, son of Nathaniel Hawthorne, born in 1846. He was engaged in various occupations until 1871, when he decided to devote himself entirely to literature. He has published: *Bressant* (1873); *Idolatry* (1874); *Garth* (1875); *Sebastian Strome* (1880); *Fortune's Fool* (1883); *Dust*, and *Noble Blood* (1884); besides numerous novelettes and short stories. He edited his father's posthumous romance, *Dr. Grimshaw's Secret*.

HAY. See AGRICULTURE and GRASSES, in these Revisions and Additions.

HAY, JOHN, an American author, born in 1838. In 1861 he was admitted to the bar of the Supreme court of Illinois, but immediately afterward became assistant secretary to President Lincoln. He acted also as his adjutant and aid-de-camp, and served for some time under Gen. Hunter and Gen. Gillmore. He was first secretary of legation at Paris, *chargé de affaires* at Vienna in 1867-68, and then secretary of legation at Madrid. From 1870 to 1875 he was on the editorial staff of the New York "Tribune," and from 1879 to 1881 was first assistant Secretary of State. He published *Pike County Bal-lads* (1871); *Castilian Days* (1871); and, with John G. Nicolay, *History of the Administration of Abraham Lincoln*.

HAYBOTE, an implied right of a tenant to take wood off the land he occupies to repair the hedges, gates and fences thereof.

HAYDEN, FERDINAND VANDEVEER (1829-87), an American geologist. In 1853 he explored the "Bad Lands" of Dakota, and in 1854-55-56 was in the basin of the upper Missouri. From 1859 to 1862 he was naturalist and surgeon to the expedition sent out to explore the Yellowstone and Missouri Rivers under Capt. W. F. Reynolds, and in the latter year became assistant surgeon of volunteers in the United States Army. In 1863 he was promoted full surgeon, and in 1865 resigned with the brevet of lieutenant-colonel. From 1865 to 1872 he was professor of mineralogy and geology in the University of Pennsylvania. He then became connected again with the government geological surveys, and remained in charge of the Montana division until 1886, when failing health compelled him to resign. He was the author of numerous scientific papers and government reports.

HAYES, ISAAC ISRAEL (1832-81), an American explorer of the Arctic regions. In 1853 he sailed as surgeon of the second Grinnell expedition in search of Sir John Franklin, and was the first civilized man to place foot on Grinnell Land. In 1860 Dr. Hayes sailed in command of the *United States*, and claimed to have reached a point which he called Cape Lieber, in lat 81° 35' N., long. 70° 30' W. Some explorers, however, surmise that his calculations were incorrect, and that he reached Cape

Joseph Good, about lat. 80° 15' N., long. 70° W. In 1863 Hayes again entered the Arctic Circle in the *Panther*. During the civil war he was surgeon of volunteers, and attained the brevet rank of lieutenant-colonel. He published *An Arctic Boat Journey* (1860); *The Open Polar Sea* (1867); *Cast Away in the Cold: a Story of Arctic Adventure for Boys* (1868); and *The Land of Desolation* (1871).

HAYES, RUTHERFORD BIRCHARD, the nineteenth President of the United States, born in Delaware, Ohio, Oct. 4, 1822. He began the practice of law at Lower Sandusky in 1845, and in 1850 removed to Cincinnati, where he was city solicitor in 1859-60-61. At the outbreak of the civil war he was appointed lieutenant-major of the 23d Ohio infantry, and shortly afterward lieutenant-colonel. He distinguished himself in the campaigns of West Virginia, and in the battles around Winchester. At South Mountain he was severely wounded. In 1864 he was promoted brigadier-general, and the following year was brevetted major-general. From 1864 to 1866 he was a member of Congress from Ohio, and



R. B. HAYES.

from 1867 to 1875 was governor of the State. In 1876 he was the Republican candidate for President of the United States. At the following election he was chosen over Mr. Samuel J. Tilden, by a majority of one vote in the Electoral College, and Mr. Hayes was inaugurated March 5, 1877. As President his career was marked with moderation, wisdom, and a sympathy with all true reforms. His independence of character was shown by his vetoes, his steady adherence to principle, and his refusal to pander to mere party politics. His term expired March 3, 1881, and Mr. Hayes retired to his home in Fremont, Ohio. He died in January, 1893.

HAYES, WALTER L., a United States Congressman, born in 1841. He was admitted to the Michigan bar in 1863; was city attorney for Marshall; was United States Commissioner for the eastern district of Michigan, and also for Iowa; was city solicitor of Clinton, Iowa, and was district judge of

the seventh judicial district of Iowa from 1875 to 1887. He was elected as a Democrat to the 50th Congress, and reelected to the 51st, 52d and 53d.

HAYNAU, JULIUS JAKOB, BARON VON, Austrian general, born at Cassel, Germany, Oct. 14, 1786, died at Vienna, March 14, 1853. Entering the Austrian service in 1801, he became noted during the Italian campaigns of 1848-49 for military skill and ruthless severity. He was engaged in the siege of Venice, when he was summoned by the emperor to Hungary, in May, 1849, to take the supreme command of the forces in that country. The storming of Raab, his victory at Komorn, his occupation of Szegedin, and his victories on the Theiss contributed materially to the final success of the imperialists; but his atrocious severity towards the defeated Hungarians excited the detestation of Europe. Appointed governor of Hungary after its pacification, he was dismissed in 1850 for insubordination.

HAYNE, ISAAC, a patriot, born in South Carolina in 1745; was a wealthy planter and iron founder at the beginning of the Revolution, and at the same time was State Senator of South Carolina. He took the field as a captain of artillery. In 1780, when the British invaded his State, Hayne served in a cavalry regiment. At the capitulation of Charleston he was paroled. In 1781 he with others, was required to join the royal army, and, being assured that he would not be made to bear arms against his country he took the oath of allegiance. Afterwards he was summoned to join the army immediately, and as this was in violation of the promises made to him he went to the American camp and was commissioned colonel of a militia company. In July, 1781, he captured Gen. Andrew Williamson, a former patriot, who had gone over to the British. But the British captured Hayne in return, threw him into the provost's prison, and after a brief examination hanged him at Charleston.

HAYNE, PAUL HAMILTON, an American poet, was born at Charleston, S. C., in 1831, and died July 6, 1886. He received his education at the Charleston schools. He published a volume of poems in 1855, a second in 1857, and a third in 1859. During the civil war Hayne wrote some fiery poems which were reprinted in Simms's *War Poetry of the South*. In 1872 he published *Legends and Lyrics*, and in 1873 he edited the *Poems of Henry Timrod*.

HAYNE, ROBERT YOUNG, was born in South Carolina, in 1791, and died in 1839. He practiced law in Charleston, and from 1818 to 1822 was attorney-general of his State, and in 1822 was elected United States senator. He opposed the tariff measures proposed in 1828, and his oratorical efforts in opposition to Henry Clay are of historical record. The great debate between Daniel Webster and Mr. Hayne upon the principles of the constitution, and the rights of the individual States, is also of historical value. In 1832 Mr. Hayne was elected governor of South Carolina.

HAYS, ISAAC, an American physician, born at Philadelphia in 1796, died there April 12, 1879. He graduated at the University of Pennsylvania and practiced in Philadelphia, especially as an oculist. In 1820 he became editor of the "American Journal of Medical Science," and had sole charge of it till 1869. In the latter year was associated with him his son, Dr. I. Minis Hays, who still edits the periodical. In 1843 Dr. Hays also established a monthly, called "Medical News," and in 1874 the "Monthly Abstract of Medical Science." He also edited *Wilson's American Ornithology*, and a number of medical works. The code of ethics of the American Medical Association was framed by Dr. Hays. It has been adopted by every medical society in the United

States. He was president of the Philadelphia Academy of Natural Sciences from 1865 to 1869. He edited Wilson's *American Ornithology*, and was the author of several useful works on medicine and the natural sciences.

HAYTER, SIR ARTHUR DIVETT, British statesman, was born in 1835. He was educated at Eton, and at Balliol and Brasenose Colleges, Oxford; he graduated in classical honors in 1857. In 1856 he obtained a commission in the Grenadier Guards, retiring in 1866 with the rank of captain. Sir Arthur Hayter was in the House of Commons as representative for Wells from 1865 till 1868, when he unsuccessfully contested East Somerset. In 1873 he was elected as member for Bath, in the Liberal interest. He succeeded to the baronetcy on the death of his father in 1878. In 1880 he was appointed a lord of the treasury, and in May, 1882, he succeeded Mr. Campbell-Bannerman as financial secretary at the war office. In 1885, and again in 1886, he stood for Bath, but was both times defeated.

HAYTI, a Republic, formerly a French colony, now governed by a constitution adopted June 14, 1867. Area (embracing the western portion of the island of Hayti), 10,204 square miles. Population (there is no official census) estimated in 1891, by best authorities, at 572,000, about nine-tenths of whom are colored persons. Capital, Port-au-Prince, with a population, in 1891, of about 40,000. For early history, productions, government, and statistics, see *Britannica*, Vol. XI, pp. 543-46.

The religion of the Republic is chiefly Roman Catholic. Public elementary education is free. There were in 1891 about 400 national schools, besides several private schools, and five public lycées. As a result largely of long-continued civil war, there has been much disorder in financial affairs, and in 1890 there was an external government debt of \$4,320,000, and an internal debt of \$9,180,000; total, \$13,500,000.

The army, under a "law of reorganization" passed in 1878, consists nominally of 6,828 men, chiefly infantry. There is a special "guard of the government," numbering 650 men with 10 generals, who act as aids to the president. In 1890 Hayti had one gun-vessel of 900 tons, a corvette, and two sloops.

In 1888 the total imports were valued at 7,543,294 piastres; exports valued at 13,250,307 piastres. The chief articles exported were: Coffee, 84,028,583 pounds; cacao, 9,927,089 pounds; mahogany, 39,262 ft.; logwood and cotton, 242,219,476 pounds—the latter chiefly to France.

The following is a list of the presidents of Hayti, from the date of the Republic:

Presidents.	Assumed Office.
Gen. Fabre Geffrard.....	Jan. 23, 1859
Sylvetre Salnave.....	March 27, 1867
Gen. Nissage Saget.....	May 15, 1870
Michel Domingue.....	May 15, 1874
Boisrond Canal.....	July 1876
Gen. Salomon.....	Oct. 22, 1879
Gen. Légitime.....	Oct. 22, 1888
Gen. L. M. L. Hippolyte.....	Oct. 17, 1889

The present constitutional term is for 7 years; salary of the president, £4,800—(\$24,000).

The historic outline for the last decade has been largely interwoven with that of San Domingo, which embraces the eastern portion of the island of Hayti. On Jan. 1, 1880, the Republic of Hayti was reported as "tranquil," and this state of things continued notwithstanding serious government trouble in San Domingo until 1883, when a negro insurrection broke out in Port-au-Prince; but this was suppressed September 22d, of the same year. In 1886 great troubles arose because of large thefts

of funds from the national bank of Hayti, resulting in convictions of doubtful desert and imprisonments against which the English and American governments protested. The prisoners were soon after released. In 1888 a revolution took place in Hayti, and Salomon was deposed. He fled to Cuba August, 1878, and died in Paris, Oct. 19, 1888. A little later an insurrection took place under Gen. Télémaque, and during the month of October, while engaged in an attack on the Palais National at Port-au-Prince he was killed with about 300 of his followers. Gen. Légitime was elected president Oct. 22, 1888, and Gen. Hippolyte was installed as president at Haytien, Jan. 1, 1889. A conflict of authority and immediate war followed. Légitime was defeated Jan. 29, 1889, and Gen. Hippolyte was defeated Feb. 20, 1889; subsequently the latter advanced on Port-au-Prince, and soon became re-established in office. During 1891 there was another outbreak at Port-au-Prince, which Hippolyte suppressed with great severity, finally extending amnesty to the lesser participants in January, 1892.

HAYWARD, ABRAHAM, essayist was born at Wishford, in Wiltshire, October 31, 1802. He had neither public school nor university education, but after keeping terms at the Inner Temple was called to the bar in 1832. His leanings were, however, more to letters than to law, yet he founded and edited the *Law Magazine*, and to every one's surprise was made Q. C. by Lord Lyndhurst in 1845. He published in 1833 his excellent prose translation of the first part of *Faust*, and soon became a busy contributor to the newspapers and magazines, especially the *Quarterly Review*, in which readers soon learned to recognize his personality in an unusual combination of vivacity, epigrammatic verve, and critical acumen. By his brilliant conversation, his wealth of anecdotes, his whist-playing, and his artistic interest in "the art of dining" he delighted society almost down to his death, at London, February 2, 1884.

HAZARD, ROWLAND GIBSON, an American manufacturer and philosopher, born at South Kingston, R. I., in 1801, died in 1888. Being engaged from his youth in manufacturing pursuits he accumulated a large fortune. In 1841, while in New Orleans, he secured the release from the chain gang of many free negroes who belonged to vessels from the North. He was twice elected to the State legislature of Rhode Island, and in 1866 also to the State senate.

HAZARD, SAMUEL, an American antiquarian, born at Philadelphia, in 1784, died there May 22, 1870. Ebenezer Hazard, the first postmaster-general of the United States was his father. S. Hazard was first engaged in mercantile pursuits, and made several voyages to the East Indies.

HAZEN, WILLIAM BABCOCK, an American general, born at West Hartford, Vt., in 1830, died in 1887. He graduated at West Point in 1855, and served in the Eighth infantry against the Indians in California, Oregon and Texas. In 1861 he became assistant professor of infantry tactics at West Point, and was made a captain in the same year. Soon after this he took command of the Forty-first Ohio regiment, and joined Gen. Buell's army. In 1862 he was appointed to command a brigade. Hazen was with Buell in Alabama, fought bravely at Shiloh, and afterwards drove the Confederates from Danville, Ky. At the battle of Stone River he saved the left wing from being vanquished. After the battle of Chickamauga he deprived the Confederates of the advantages they had gained, and relieved the army at Chattanooga. At Missionary Ridge he captured 18 cannons. During Sherman's famous march to the sea Hazen commanded a division.

With this he captured Fort McAllister, Dec. 13, 1864, and was promoted major-general of volunteers. Afterwards he took part in forcing Johnston to surrender, and was made commander of the Fifteenth corps, May 19, 1865. After the war Hazen was made colonel of the Sixth infantry of the Regular Army. In December, 1880, he was appointed chief signal officer, with the rank of brigadier-general. While in this office he sent Lieut. Greeley to Lady Franklin Bay to make meteorological observations, introduced the "cold-wave signals," promoted the use of local and railway weather signals, organized special observations for the cotton-producing States, established frost warnings, and initiated forecasts for vessels coming to this country from Europe. He published: *The School of the Army in Germany and France, with a Diary of Siege-Life at Versailles*, in 1872.

HAZLETON, a city of Luzerne county, Pa. Its location, in the midst of a great coal region, and on two great railroads, the Lehigh Valley and the Pennsylvania roads, has been favorable to its leading industries. Among its manufactures are undertakers' supplies, pianos and organs, spring guns, iron and flour, and a beef company, established in 1884, does an extensive business. The public schools are excellent. The miners' new hospital is an extensive and commodious building. There are public halls and numerous churches. There are two daily, one semi-weekly, and two weekly papers, and three banks in the city. Population in 1880, 7,161; 1890, 11,818. See *Britannica*, Vol. XI, p. 549.

HEADACHE can scarcely ever be called a disease, but it is a common symptom of many ailments. It is sometimes caused by serious mischief within the cranium, but far more frequently it depends upon an alteration in the quality of the blood, or in a deficient or excessive supply of it to the head. The deterioration in quality may be caused by fevers, by inflammations of various organs—e. g. the kidneys, or even by breathing the air of a crowded room. The congestive form of headache is often produced by mere mechanical obstruction to the return of blood from the head. A tight collar or an awkward position of the neck during rest may cause it. This form of headache is aggravated by stooping. On the other hand the anæmic variety is often relieved by lying down. The neuralgic headache is one of the commonest of all, and is especially associated with the hysterical tendency. Another variety which is on the increase in this hurried and hard-driven generation is that caused by excessive brain-work. Lastly, there is the sick headache, *megrin* or *migraine*, which comes on periodically in paroxysms, often associated with bilious vomiting.

HEADLEY, JOEL TYLER, an American author, born at Walton, Delaware county, N. Y., in 1814. After graduating at Union College in 1839 he studied theology at Auburn Theological Seminary, and became pastor of a church at Stockbridge, Mass. Ill-health soon obliged him to give up pastoral work. In 1842 he went to Europe, and on his return published *Letters from Italy and the Alps and the Rhine*. In 1855 he was elected Secretary of State of New York.

HEADLEY, PHINEAS CAMP, an American author, born at Walton, N. Y., in 1819. He studied law and was admitted to the bar in 1847. Afterwards he studied theology in the Seminary at Auburn, N. Y., and held pastorates in the Presbyterian and Congregational churches.

HEALDSBURG, a city of Sonoma county, Cal., situated on the San Francisco and North Pacific Railroad, 66 miles north of San Francisco, and 20 miles from the ocean. It has an academy, a graded

school, and manufactories of chairs, baskets and wine. Population (1890), 1,485.

HEALY, GEORGE PETER ALEXANDER, an American portrait painter, born at Boston, Mass., in 1813. He studied for several years in Paris, and painted afterwards the portraits of Louis Philippe, Marshal, Sout, Lewis Cass, Clay, Calhoun, Daniel Webster, Seward, Pierce, Gen. Sherman, William H. Prescott, H. W. Longfellow, Cardinal McCloskey and Stephen A. Douglas. In 20 years he executed nearly 600 portraits. In 1851 he completed his large historical picture of *Webster's Reply to Hayne*, which contains 130 portraits and hangs now in Faneuil Hall, Boston. In 1855 he exhibited at Paris a large picture representing Franklin urging the claims of the American colonies before Louis XVI, besides a series of 13 portraits. To the Philadelphia Centennial Exhibition he sent portraits of Thiers, the Princess of Roumania, Elihu B. Washburn, and Lord Lyons.

HEALY, TIMOTHY M., a member of Parliament, born at Bantry, Ireland, in 1855. He took an active part in the Land League agitation in 1880, and was arrested on a charge of intimidation, but was acquitted at the trial. Elected to parliament without opposition, he took a lively interest in the discussions of the Land Bill of 1881, and obtained the insertion of the clause which excluded the improvements made by tenants from rent. This clause was since known as the *Healy clause*. In 1882 he was sentenced to imprisonment for six months for intimidation; but he was released after four months' service. In 1884 Healy was called to the Irish bar, and was afterwards one of the counsel for the scheduled members before the Parnell commission. In the Parliamentary session of 1890 Healy delivered many speeches in Ireland's cause, and appeared on behalf of the Irish members at Tipperary. In 1892 he was returned for North Louth.

HEARD, JOHN T., a United States Congressman, born in 1840. He was admitted to the Missouri bar in 1862, and in 1872 was chosen to the State Legislature. In 1881 he was elected to the State Senate, serving four years, and then to the 49th, 50th, 51st 52d and 53d Congresses.

HEARD'S ISLAND, an island in the South Indian Ocean, extending between 53° 2' and 53° 14' S. lat., and between 73° 30' and 72° 30' E. lon. It is 30 miles long and 10 miles wide, and its highest point, Kaiser Wilhelm Peak, is about 6,000 feet high. The island was discovered by Captain Heard in 1853.

HEARING IN PRESENCE: in the law of Scotland, a hearing of a difficult or important case before the whole of the thirteen judges of the court of session. In England it is not in general competent for any court, when equally divided, to order a case to be argued before all the other courts sitting together.

HEARING OF A CAUSE, the phrase used in the court of chancery, when the merits of the case and the arguments on both sides have been entered upon.

HEARNE, a post-village of Robertson county, Texas, about 3 miles east of the Brazos River, at the junction of the Houston and Texas Central Railroad and the International and Great Northern Railroad. The car shops of the latter railroad are located here.

HEARSE, the carriage in which the dead are conveyed to the grave, but originally the term applied to a triangular bar or framework with upright spikes for holding candles at a church service, and especially at funeral services. It was originally very simple in form, but in the 15th and 16th centuries hearses or "horses" of great splendor

came into use, and were erected in the churches over the bodies of distinguished personages. From this the transition to the modern funeral hearse can be easily traced.

HEARST, GEORGE, a United States Senator, born in 1820, died Feb. 28, 1891. In 1865 he was elected to the California State Legislature, and in 1886 he became United States Senator to fill the vacancy caused by the death of John F. Miller. In 1887 he was again sent as a Democrat to the United States Senate to succeed A. P. Williams, Republican.

HEART'S CONTENT, a port of Newfoundland, beautifully situated on the S. E. side of Trinity Bay, in lat. 47° 50' N., lon. 53° 20' W. It is the landing-place of the Atlantic telegraph cables extending to Valentia, Ireland, and there are overland wires connecting with St. John's and Cape Ray. It has a fine telegraph building. Most of the inhabitants are engaged in fishing. Population, 900.

HEATH, WILLIAM, an American Revolutionary general, born at Roxbury, Mass., in 1737, died there June 24, 1814. He was active in organizing the militia before the Revolution; was a captain in the Suffolk regiment, of which he afterward became the colonel, joined the artillery company of Boston, and was chosen its commander in 1770. In 1774-75 he was a member of the Provincial Congress, and as provincial brigadier-general he performed valuable services in the pursuit of the British troops from Concord on April 19, 1775. He organized and trained the undisciplined forces at Cambridge before the battle of Bunker Hill. Upon the organization of the Continental Army he was commissioned a brigadier-general, and stationed at Roxbury with his command; and on Aug. 9, 1776, he was made a major-general in the Continental Army. In March, 1776, he opposed the evacuation of the city of New York. After the battle of White Plains he took command of the posts in the Highlands. In 1777, he had charge of the prisoners of Burgoyne's army at Cambridge. In June, 1779, he took charge of the posts on the Hudson with four regiments, and remained in that vicinity till the close of the war. After the war he returned to his farm, was a member of the convention that ratified the Federal Constitution, was a State Senator in 1791-92 and probate judge of Norfolk county in 1793. In 1798 he published *Memoirs of Major-General William Heath, containing Anecdotes and Details of Skirmishes, Battles, etc., during the American War*.

HEAVYSEGE, CHARLES, a Canadian poet, born in Yorkshire, England, in 1816. After receiving a limited education he became a wood carver, and emigrated to Montreal, Canada, in 1853. There he worked at his trade, but in his leisure hours he studied the Bible and Shakespeare. Frequently he contributed to the daily press, and acquired after awhile a reputation as a poet. After his first juvenile effort at poetry, *The Revolt of Tartarus*, and some 50 sonnets, he published *Saul*, a drama, in three parts, in 1857; *Count Filippo or the Unequal Marriage*, a drama in 5 acts; *Ode on Shakespeare*, and *Jephtha's Daughter* (1855). He died in 1876.

HEBREWS, EPISTLE TO THE. See *Britannica*, Vol. X, pp. 602-07.

HECATOMB: in the worship of the Greeks and in other ancient religions, a sacrifice of a large number of victims; properly, although by no means necessarily, one hundred. As early as the time of Homer it was usual only to burn the legs wrapped up in the fat and certain parts of the intestines, the rest of the victim being eaten at the festive meal after the sacrifice. In Athens the hecatomb was a most popular form of sacrifice,

while the Spartans limited the number of victims and sacrifices. In the hecatomb, strictly so called, the sacrifice was supposed to consist of one hundred bulls, but other animals were frequently substituted.

HECKER, FRIEDRICH KARL FRANZ, a German revolutionist, born at Eichtersheim, Baden, in 1811, died at St. Louis, Mo., March 24, 1881. He studied law at Heidelberg, and had afterwards a good law practice at Mannheim, but he entered politics. In 1842 he was elected to the chamber of deputies of Baden, and soon became a prominent member of the opposition. While visiting Berlin he was arrested and ordered out of the Prussian domain. This made him popular with the revolutionary class. In 1846-47 he was the leader of the extreme left in the Baden Diet. At Heidelberg he appeared in 1848 as a red-hot republican and socialist-democrat, and with the aid of Struve tried to unite the South-Germans in a revolutionary movement. Soon he placed himself at the head of columns of armed workmen, unfolded the banner of the social republic, and advanced into the southern (Black Forest) part of Baden. Gen. Siegel was the military leader. They were beaten by the Baden soldiery at Kandern, May 20, 1848, and had to retreat into Switzerland. In September of the same year Hecker emigrated to America, but was recalled by the provisional government erected in Baden in 1849. Before his arrival in Baden the new government had, however, collapsed, and Hecker returned at once to America, settling as a farmer near Belleville, Ill., and became a citizen of the United States.

In 1856 he was a prominent speaker in behalf of the Republican party. The first German Illinois regiment was raised by him in 1860. He served in Gen. Fremont's division as colonel of this regiment, and afterwards as brigadier-general under Gen. Howard. At the battle of Chancellorsville he was wounded. In March, 1864, he resigned, and retired to his farm. In the winters he often delivered popular lectures to German-Americans. During the Franco-German war he hoped that Germany would soon be ripe for a republic, but after visiting Germany in 1873 he felt disappointed by the actual political condition in Germany.

HECKER, ISAAC THOMAS, an American clergyman, the founder of the Paulists, born at New York in 1819, died in 1889. In 1843 he joined the Brook Farm Community, near Boston, where for nine months he baked the bread eaten by the members. After this he worked with his two brothers in the flour business, and gave the workmen frequent lectures. In 1845 he became a Roman Catholic; went to Germany to study for the priesthood; joined the Redemptorist fathers in Belgium in 1847, and was ordained priest in London in 1849 by Cardinal Wiseman. After being released from connection with the Redemptorists, he founded in 1858 the new congregation of the missionary priests of St. Paul (the Paulist fathers), having their principal house in New York city. The members take no vows, and any priest can leave the order when he chooses. They are nearly all Americans converted from Protestantism. Hecker established "The Catholic World," a monthly periodical, in 1855; wrote the *Questions of the Soul*; *Aspirations of Nature*, and a pamphlet on *Martin Luther* (1883); and many other papers.

HECKEWELDER, JOHN GOTTLIEB ERNST, an American Moravian missionary to the Indians, born at Bedford, England, in 1743, died at Bethlehem, Pa., Jan. 21, 1823. His father brought him to Pennsylvania in 1754, where he was afterwards apprenticed to a cooper. In 1762 he visited the Indian

tribes on the Ohio with Christian F. Post, a colonial Indian agent, and in 1771 he became a missionary to the Delaware Indians. In 1792 and 1793 he accompanied the United States commissioners sent to make treaties with several Indian tribes near the Great Lakes. After staying in Ohio for some years as postmaster, justice of the peace, and also of the court of common pleas, he retired to Bethlehem, Pa., where he studied the languages and customs of the Indians, especially the Delawares, and wrote a *History of the Indians of Pennsylvania* (1819); *Narrative of the Mission of the United Brethren Among the Delaware and Mohegan Indians* (1820); and a collection of *Names Which the Delaware Indians Gave to Rivers, Streams and Localities Within the States of Pennsylvania, New Jersey, Maryland and Virginia, With Their Significations* (1822).

HECKLES (Mid. Eng., *hekele*, from the Dutch *hekel*, *traak*, "a hook"), very important parts of various machines employed in the preparation of animal and vegetable fibers for spinning. They consist of a series of long metallic teeth, through which the material is drawn so that the fibers may be combed out straight and so fitted for the subsequent operations. Gills are heckles with finer teeth. *Heckling* is also now the received term for the rough and trying process of catechization to which Parliamentary candidates and members are subjected by their British constituencies.

HECTIC FEVER (Gr., *hektikos*, "habitual"), the name given to the fever which occurs in connection with certain wasting diseases of long duration. It is one of the most serious and constant symptoms of consumption, and seems to be directly related to the progressive emaciation which marks the course of that malady. In the morning the patient's temperature may be normal, but towards evening or after eating he grows hot and flushed, and there is a preternatural vividness of expression, which, with the heightened color, sometimes gives a very fallacious impression of health. The patient retires to bed, has uneasy sleep, and awakens in the middle of the night or towards early morning, bathed in cold perspiration, and in a state of extreme languor. The same exhausting cycle repeats itself day after day. The only radical way of treating the fever is to cure the disease on which it depends. When the symptom itself must be combated, a pill containing a grain of sulphate of quinine, with half a grain of digitalis and as much of Dover's powder, taken three times a day, is often serviceable.

HEDDING, ELIJAH, bishop in the Methodist Episcopal church, born at Pine Plains, N. Y., in 1780, died at Poughkeepsie, April 9, 1852. He became a Methodist in 1799, and was licensed to preach in 1800. He preached in Northern New York, Vermont and New Hampshire, enduring sometimes great hardships. In 1807 he was appointed presiding elder of New Hampshire district, and in 1808 was a delegate to the general conference at Baltimore. After 25 years of itinerant labors he was elected and ordained bishop, and for nearly 28 years longer served his church with great zeal. During his episcopate he lived mostly at Lynn, Mass., but in 1851 he removed to Poughkeepsie, N. Y. Hedding assisted in founding "Zion's Herald," the first Methodist Episcopal journal in the United States, subsequently merged in the "Christian Advocate." He was an eloquent preacher, forcible and convincing, yet pleasant and cheerful in private life.

HEDGE, FREDERICK HENRY, an American clergyman and author, was born at Cambridge, Mass., in 1805, died in 1890. In charge of George Bancroft he was educated in Germany. On his return to

America he studied theology at the Cambridge Divinity School, and in 1829 became pastor of the Unitarian church at West Cambridge. In 1835 he took charge of a church at Bangor, Me., and in 1850, after spending a year in Europe, he became pastor of the Westminster church at Providence, R. I., from which he removed to Brookline, Mass., in 1856. In 1858 Hedge became professor of ecclesiastical history in the theological department of Harvard College, and edited at the same time the "Christian Examiner." In 1872 he assumed the professorship of the German language in the same college. Besides many poems and frequent contributions to the "North American Review" and other periodicals, Dr. Hedge published *The Prose Writers of Germany* (1848); *Reason in Religion* (1865); *The Primeval World of Hebrew Tradition* (1870); *A Christian Liturgy for the Use of the Church*, etc. He also wrote hymns for the Unitarian church and published translations from the German poets.

HEDGE-MUSTARD (*Sisymbrium*), a genus of plants of the natural order *Cruciferae*, annual or rarely perennial herbs, with various foliage, small yellow or white flowers, and a long roundish or six-angled pod (*siliqua*). Several species are natives of Britain, of which one, the common hedge-mustard (*S. officinale*), was once employed in medicine. It is said to be diaphoretic and expectorant, and has a mild pungency. It is an annual plant, sometimes two feet high, branched, with renunciate or deeply-lobed leaves, stem and leaves hairy, flowers very small and yellow, and it is sometimes cultivated as a pot herb. The pods are erect and closely pressed to the stalk.

HEEN, CHOW, TING AND FOO, Chinese geographical terms used to designate the relative rank of cities and districts. Generally speaking, however, the terms designate the rank of cities, from *foo*, the chief, to *heen*, the least in size.

HEFELE, KARL JOSEPH, VON, German theologian, born at Unterkochen, in Württemberg, March 15, 1809. He studied at Tübingen, and in 1836 became privatdocent, and in 1840 professor of church history and Christian archaeology, in the Catholic theological faculty of that University. In 1869 he was made bishop. As a member of the Vatican council, he voted against Papal infallibility, but afterwards submitted. He became widely known as an eminent church historian through his *Apostolic Fathers* (1839); *Review of Wessenberg's Church Councils* (1841); *History of the Christian Councils* (1855-74); *Pope Honorius, Cardinal Ximenes* (1851); *Contributions to Church History*, and other works.

HEGESIPPUS, the earliest of the Christian church historians. Of his life we know nothing save that he was almost certainly a Jewish convert, and that he flourished about the middle of the 2d century. He must have written most of his history previous to A. D. 167, and probably published it early in the episcopate of Eleutherus. His work was entitled *Five Memorials of Ecclesiastical Affairs*, and appears not to have been a complete and continuous history, although extending from the death of Christ to the writer's own age. Unhappily it survives only in a few fragments which Eusebius had embodied in his own history, the most important of which are his account of the martyrdom of St. James and also of St. Simeon of Jerusalem.

HEIGHTS may be determined by four methods: by trigonometry, by leveling, by ascertaining and comparing the atmospheric pressure at top and bottom of the height by the barometer, or by ascertaining and comparing the boiling point of water at the top and bottom by the thermometer.

HEINSIUS, ANTHONY, a Dutch statesman, born at Delft, Dec. 22, 1641, died Aug. 13, 1720. He studied law at Leyden; in 1688 became grand pensionary of Holland, and as the close friend of William III (of England) guided Dutch politics till his death.

HEINTZELMAN, SAMUEL PETER, an American soldier, born at Manheim, Lancaster county, Pa., in 1805, died in 1880. He graduated at West Point in 1826; spent several years in border service as lieutenant, served during the Mexican war as captain, and was on the 9th of October, 1847, brevetted major for bravery. He then organized a battalion of recruits and convalescent soldiers at Vera Cruz, and marched them to the City of Mexico. After serving in California against the Indians and on the Rio Grande against Mexican marauders, he was brevetted lieutenant-colonel in May, 1861, for meritorious services, and was made inspector-general of the United States forces with headquarters at Washington. Afterwards he commanded a division of McDowell's army at the battle of Bull Run, and was wounded. In March, 1862, Heintzelman was in command of the third army corps; took an active part in the battles of Williamsburg and Fair Oaks; in the seven days' fighting around Richmond; in the second battle of Bull Run, and commanded the defenses of Washington. He was now major-general. After the war he served in New York harbor and Texas as colonel of the 17th infantry. In April, 1869, he was placed on the retired list with the rank of major-general.

HEIR AND EXECUTOR, a short phrase to denote that branch of the law in which a leading distinction is made between the two kinds of property left by a deceased person, real and personal. If real, it goes to the heir-at-law; if personal, it goes to the executors or administrators. In Scotland the same leading distinction exists under the head of heritable and movable, but in Scotland some things are classed among heritable which in England would not be classed among real property.

HEIR-APPARENT, in English law, means the person who is certain to succeed if he outlive his ancestor; thus the eldest son is so, because no other person can ever come between and obtain precedence.

HEISS, MICHAEL, born in Bavaria, on April 12, 1818; removed to the United States in 1842, and acted as a missionary priest in Wisconsin for several years. In 1868 he became bishop of La Crosse, Wis. In 1880 he was made coadjutor-bishop of Milwaukee, with right of succession, and in 1881 succeeded to the see. He was one of the most distinguished members of the Vatican Council of 1870. He died March 26, 1890.

HEL: in Norse mythology, the goddess of the dead and daughter of the evil-hearted Loki. The All-father hurled her down into Nifheim, and gave her authority over the lower world. She was of fierce aspect, and to her were assigned the characteristics of insatiable greed and pitilessness. After the diffusion of Christianity the ideas personified in Hel gradually merged, among the races of Scandinavian and German descent, in the local conception of a hell, or dark abode of the dead.

HELENA, a city and county-seat of Phillips county, Ark., situated on the Mississippi River and containing Southland College. Pop. (1890), 5,189.

HELENA, the capital of Montana and county-seat of Lewis and Clarke county, situated among foot-hills in the Prickly Pear valley, about fourteen miles from the Missouri River, and with the Rocky Mountains rising behind the city to the south. The Northern Pacific Railroad passes through Helena, and the city is connected with the Canada Pacific

and the Union Pacific roads, and by branch lines with several mining camps. Many of the streets are wide and straight, shaded with rows of cottonwood trees, and faced with handsome residences and business premises, and well lighted with gas and electricity. There are six street railways. A board of trade was organized in 1887. There are thirty-four graded schools, a high school and a number of private and parochial schools. Montana University, opened in 1890, is located outside the city. Charitable institutions are numerous, industries of nearly every type are pursued, and nearly all religious denominations are represented by the churches of the city. Gold was found here in 1864, and the camp was known as Last Chance Gulch until December of that year, when it received its present name. Population in 1890, 13,834. See *Britannica*, Vol. XVI, p. 774.

HELIACAL RISING (from Gr. *helios*, "the sun"). A star is said to rise heliacally when it rises just before the sun. When the sun approaches a star which is near the ecliptic, the star becomes for a time invisible; the heavens being too bright in the quarters of sunrise and sunset, at the times of its rising and setting, to allow it to be seen. But when the sun, progressing in its orbit, separates from the star, and the latter begins to rise first, it in time rises so much earlier than the sun as just to be visible before daylight. It is then said to rise heliacally.

HELICIDÆ (Gr. *helix*, "a spiral"), a large family of terrestrial air-breathing (pulmonate) gastropods, of which snails are familiar examples.

HELGOLAND ("Holy Land"), an island 36 miles north of the Elbe mouth (see *Britannica*, Vol. XI, p. 630). It consists of a rock 200 feet high, on which are a village and a light-house. It is the resort of bathers from Hamburg. During 1890 the announcement of its proposed transference, under the terms of the Anglo-German agreement respecting Africa, from British to German rule, came as a complete surprise upon the public of both countries, and various opinions were speedily elicited as to the propriety of the step contemplated. In England the value of the island as a naval station was strongly insisted upon; it was declared that the Heligolanders themselves were bitterly averse to the change, and Lord Salisbury was loudly reproached in some quarters for not having ascertained more carefully their views upon the subject. The protests, however, proved unavailing, and on August 9 the island was formally handed over to Germany, the ceremony being followed by the visit of the German emperor on the next day, when a proclamation was read in which his majesty promised the utmost care for the rights and wishes of the islanders, and announced that all living males would be exempt from compulsory military and naval service, to which they have a remarkable abhorrence. The revenue of the island in 1888 was slightly over \$40,000, and the expenditure over \$35,000.

HELLER, STEPHEN, German pianist and musical composer, born at Pesth, May 15, 1814, died at Paris Jan. 14, 1888. He made his debut as a pianist when only nine years of age, and before he was sixteen had played in many of the principal cities of Europe. In 1830, he settled in Augsburg, and began the study of composition. In 1838 he removed to Paris, where he occupied himself with composing and teaching until his death. His works are distinguished by originality and refinement.

HELIOCENTRIC: in astronomy, having the sun (Gr. *helios*) as center of reference; the heliocentric place of a planet being opposed to its geocentric (Gr. *gē* "earth"), its place as seen from the earth.

HELL GATE, named by the Dutch settlers of New York *Helle Gat*, is a pass in the East River, between New York City and Long Island, formerly very dangerous to vessels from its numerous rocks and its rapid currents. These rocks and reefs were in mid-channel, and projected also from several small rocky islands. The largest were known as the Gridiron, Flood Rock, Hen and Chickens, Negro Head, Bread and Cheese, Hallett's Point, Way's Reef, Pot Rock, Frying Pan, Middle Reef, etc. In 1851 attempts were made to blast away the obstructions, and in these operations Maillefert's process of surface-blasting was employed. This consisted in placing charges of gunpowder, usually 125 pounds, on the surface of a rock and exploding the powder by means of an electric current. The rocks thus operated upon were Pot Rock, Frying Pan, Way's Reef, Bald-headed Billy, Shelldrake Rock, and Diamond Reef. On all of them the depth of the water was increased, in some cases only 2 feet, and in others as much as 10 feet. These improvements consumed over 74,000 pounds of gunpowder, and cost about \$14,000. The money was furnished by New York City. In these operations the broken material was not dredged or otherwise cleared away.

The depths obtained were not sufficient for first-class vessels. Besides, a number of other obstructions remained in the channel. The U. S. Government, therefore, appropriated \$20,000 in 1852; and Major Frazer, U. S. E., continued the surface-blasting on Pot Rock in the same year, thereby increasing the depth of the water over this rock from 18 to 20 feet. By this time it was deemed necessary to adopt other methods of working. Drilling under water through diving-bells was impossible, because the current runs too fast and the space was too small. The question arose, How can this work be done successfully? No satisfactory plan was devised until 1866, when Gen. John Newton, U. S. E., proposed drilling from a fixed platform through tubes reaching to the surface of the rocks. Congress made now sufficient appropriations for the work.

In 1869 Newton used a floating scow having a central opening of 32 feet diameter, through which a large hemispherical iron bell, open both at top and bottom, was lowered to the rock below. This dome-like caisson, made of boiler iron, afforded a frame-work for supporting 21 drill tubes. Drills weighing from 600 to 900 pounds worked through these tubes. The bell had legs which could be let out or drawn in to fit the rock. Cams were used to hold the legs in place. After the drilling was completed the drill-holes were filled by a diver, who inserted charges of nitro-glycerine and made the electrical connections with the fuses. After this the scow was floated away and the blasts fired. The broken rock was removed by means of a steam grapple.

In 1871 Newton used a steam-drilling scow on the Diamond Reef. He now drilled holes from 7 to 13 feet deep and 4 inches in diameter. He fired them with charges of from 30 to 55 pounds of nitro-glycerine. In 1871 he operated in like manner on Coenties Reef; in 1872 on the Frying Pan and Pot Rock. In that year the scow was struck 16 times by colliding vessels, and four of the latter were sunk by it. One vessel was drawn under the scow and carried off its dome; but the dome was afterwards recovered in a damaged condition. In 1874 Newton reduced Way's Reef from 17 feet to a depth of 26 feet.

The most difficult problem was the removal of the reef at Hallett's Point. To accomplish this he sank a large shaft on shore in 1869. From this

shaft 41 radial and 11 concentric galleries of various cross-sections were driven under the reef. The length of all these galleries together amounted to nearly $1\frac{1}{2}$ miles. Diamond drills, Ingersoll drills, Burleigh drills and hammer drills were all used in this work. The excavations were completed in June, 1876. Then holes were drilled in piers and roofs for the charges. From Sept. 11, 1876, till the 20th of the same month was occupied by charging the holes. Twenty-three distinct galvanic batteries, aggregating 960 cells of zinc and carbon, were arranged to fire 160 fuses each; 3,680 mines were connected in continuous series with a lead and return wire, so that the circuits of all could be closed with one circuit-closer—i. e., by pressing down a button. After everything was ready the mines were tamped by water run in through a syphon; and on Sunday, Sept. 24, 1876, they were fired at 2.50 p. m. without any hurtful shocks to surrounding objects. The water was thrown up to a height of 123 feet. The total expense of this blast was \$81,092.

Flood Rock, situated in mid-channel, was still projecting above water, and constituted a dangerous reef. Work tending to its removal began June, 1875, by sinking a shaft 10 feet by 20 feet down through the rock. During the following year the mine was filled with water. Want of appropriations caused several suspensions, which added considerably to the cost of the work, in consequence of the pumping required to free the mine from the water flowing into it by some large seams. In 1874 the undermined area covered 9 acres. The total length of the galleries, 10 feet square, was 21,670 feet. The drill-holes for breaking up the roof and columns amounted to a total length of 113,000 feet, or over 20 miles. For charging the drill-holes cartridges 2 feet long were inserted and held in place by 4 small wire legs. These cartridges were filled with "rackarock," a mixture of 79 per cent. of finely ground chlorate of potash with 21 per cent. of dinitro-benzole. After filling the drill-holes with several rackarock cartridges, a dynamite cartridge, 15 inches long, with a fulminate of mercury exploder, was inserted. The mine was fired by primary charges of dynamite placed at intervals of 25 feet along the galleries, lashed to some timbers. Their explosion produced a concussion strong enough to ignite the fulminate primers in the charges of rackarock. By this "sympathetic" method the entire mine, containing over 120 tons of rackarock and 42,000 pounds of dynamite, was simultaneously exploded, on Oct. 10, 1884. The battery contained 60 bichromate cells connected together in series. When the electric contact was made a dull thud was heard, the earth shook for a considerable distance, and an immense mass of water was thrown some 200 feet up into the air. But no damage was done except the breaking of a few dozen panes of glass and shaking down some loose brick and plaster in Astoria. No severe shock was felt anywhere. Yet the entire roof of the mine was shattered, and about 500,000 tons of rock were loosened. The total expense of this blast was \$106,509.

Immediately after this explosion dredging was commenced with the Government scow, but in October, 1885, a contract was let for the removal of 30,000 tons of loosened rock, and afterwards other similar contracts were let. About 120 tons were removed daily for a considerable time. But there are some of the rocky obstructions yet to be removed, inasmuch as the mean low-water depth is not quite 26 feet over the Diamond Reef, Coenties Reef, a reef near the North Brother's Island, and the Pilgrim Rock, which have been included in

the projected improvements. Both the main and Eastern channels, however, now afford passages wide and deep enough for the largest vessels.

HELMET-SHELL, the shell of a mollusk belonging to the genus *Cassia*, a thick, heavy shell, with bold ridges, a short spire, and a long aperture, the outer lip toothed, the canal recurved. There are numerous species, most of them found in tropical seas, some in the Mediterranean. The shells are made up of differently colored layers, and are much used for the manufacture of cameos.

HELMHOLTZ, HERMANN LUDWIG, a distinguished German physiologist and natural philosopher, was born in 1821, at Potsdam, Prussia. After studying medicine in the Military Institute at Berlin, and being attached for a time to the staff of one of the public hospitals there, he returned to his native town as an army surgeon. In 1848 he was appointed professor of anatomy in the Academy of Fine Arts at Berlin; in 1855 professor of physiology at Königsberg, whence he removed, in 1858, to Heidelberg, where he also filled the chair of physiology. He was afterwards appointed professor of physiology at Berlin. The works of Professor Helmholtz, which are well known throughout Europe, have reference principally to the physiological conditions of the impressions on the senses. Among those most deserving of notice are: *On the Preservation of Force*, 1847; *Manual of Physiological Optics*, 1856; and *Theory of the Impressions of Sound*, 1862. His *Popular Lectures on Scientific Subjects*, were published in London in 1873, and his work on *Sensations of Tone*, as a *Physiological Basis for the Theory of Music*, appeared in 1875. Professor Helmholtz has also contributed to scientific journals accounts of many of his experiments in acoustics, optics, and electricity. On December 1, 1873, the Copley medal of the Royal Society of London was awarded to him in recognition of his eminent services to science.

HELPER, HINTON ROWAN, born in North Carolina, December 27, 1829; became consul for the United States to the Argentine Republic in 1861, which office he held for six years. His chief title to fame is as the author of a book called the *Impending Crisis of the South*, which, on its publication in 1857, attracted great attention.

HEMIBRANCHII, an order of teleocephalous fishes, having the palatine bone directly articulated with the quadrate, imperfect branchial arches, and a peculiar structure of the shoulder-girdle. Six families are referred to this order: the *Gasterosteidae* or sticklebacks, *Fistulariidae* or pipe-fishes, *Aulorhynchidae*, *Aulostomidae*, *Centriscidae* and *Amphisiilidae*.

HEMITRIPTERIDÆ, a family of acanthopterygian fishes, represented by the genus *Hemitripterus*. It includes *Coltoidea* having numerous vertebrae (16 abdominal plus 23 caudal), an elongated spinous dorsal fin, imperfect ventrals enveloped in a thick skin, and inflated head with prominent orbits. The family is represented on the coasts of the United States by a species known as the deep-water sculpin, *Hemitripterus Acadicus*.

HEMLOCK, or HEMLOCK SPRUCE. See FIR, Vol. IX, pp. 222-25.

HEMPHILL, JOHN J., a United States Congressman, born in 1849. He was admitted to the South Carolina bar in 1870. In 1876 he was elected as a Democrat to the legislature, and reelected in 1878 and 1880. He was a member of the 48th, 49th, 50th and 51st Congresses.

HEMPSTEAD, a village of Queens county, N. Y., in Hempstead township, situated on the Long Island Railroad, 21 miles east of New York City. It has Hempstead Institute, public halls, a seminary, and many fine residences. The township of Hemp-

stead is bounded on the south by the Atlantic Ocean, and includes Rockaway, a fashionable bathing place. Population in 1890, 23,517.

HEMPSTEAD, a railroad junction and county-seat of Waller county, Texas. It has a cotton factory and manufactures cotton-seed oil.

HENDECAGON, or ENDECAGON: in geometry, a plane figure of eleven sides and as many angles. The area of a regular or equilateral endecagon is very nearly equal to 9.36564 times that of the square of one of its sides.

HENDERSON, a railroad junction and county-seat of Vance county, N. C. Its principal industry is connected with tobacco.

HENDERSON, the county-seat of Henderson county, Ky., on the Ohio River, 212 miles southwest of Louisville. It has car works, wagon and carriage factories. Pop. (1890), 8,835.

HENDERSON, the county-seat of Rush county, Texas. It is the seat of Henderson College.

HENDERSON, DAVID BREMNER, a United States Congressman, born in 1840. He was admitted to the Iowa bar in 1865. In 1861 he enlisted in the Union army, and served until discharged in 1863, owing to the loss of his leg. He reentered the army the following year as colonel, and served until 1865, when he became collector of internal revenue for the third district of Iowa. He resigned in 1869, and became assistant United States district attorney for the northern division of the district of Iowa, and served two years. He was chosen as a Republican to the 48th, 49th, 50th, 51st, 52d and 53d Congresses.

HENDERSON, JAMES PINCKNEY, an American soldier and statesman, born in Lincoln county, N. C., in 1808, died in Washington, D. C., June 4, 1858. After studying law he moved to Mississippi in 1835, and practiced law there until the Texas troubles began. He volunteered in the Texan army, and was appointed brigadier-general in 1836. When the army was disbanded, President Houston appointed Henderson attorney-general of Texas. Subsequently he was secretary of State. In 1839 he was sent to England and France in order to procure the recognition of Texan independence. In 1844 he was special minister to the United States to negotiate the annexation of Texas. In 1846 Henderson was a member of the State constitutional convention, and when the constitution was ratified he was elected governor of Texas. In the Mexican war he took command of the Texan corps of volunteers, distinguished himself at Monterey, and received afterwards the thanks of Congress and a sword for bravery in action. In 1857 he was chosen a United States Senator, and took his seat in March, 1858.

HENDERSON, JOHN STEELE, a U. S. Congressman, born in 1846. He entered the Confederate army in 1864, and served through the war. In 1876 he was a member of the North Carolina Legislature, and of the State Senate in 1878. In 1881 he was elected one of three commissioners to codify the statute laws of the State, and in 1884 became presiding justice of the inferior court of Rowan county. He was elected as a Democrat to the 49th, 50th, 51st, 52d and 53d Congresses.

HENDERSON, THOMAS J., a United States Congressman, born in 1824. In 1852 he was admitted to the Illinois bar, and was a member of the Legislature in 1855 and 1856, and of the State Senate in 1857, 1858, 1859 and 1860. In 1862 he entered the Union army, and served till the close of the war, receiving the brevet of brigadier-general. He was a Republican member of consecutive Congresses from the 44th to the 53d, both inclusive.

HENDRICKS, THOMAS ANDREWS, an American statesman, born near Zanesville, Ohio, in 1819,

died suddenly at Indianapolis, Nov. 25, 1885. He graduated at South Hanover College, Ind., in 1841, studied law at Chambersburg, Pa., and was admitted to the bar there in 1843. He afterwards practiced law at Shelbyville, Ind., very successfully. In 1850 he was elected to the State convention to revise the constitution of Indiana. From 1851 to 1855 he was a member of Congress, after which President Pierce appointed him commissioner of the U. S. general land office. In 1863 Mr. Hendricks was elected to the U. S. Senate from Indiana, and was one of the leaders on the Democratic side. In 1872 he became governor of Indiana. After the expiration of his term, Mr. Hendricks continued to practice law at Indianapolis until 1884, when, after the nomination of Grover Cleveland for President at the Chicago convention, he was unanimously nominated for Vice-President, and in November was elected. He was an effective public speaker and an earnest Democrat.

HENLE, FRIDERICH GUSTAV JAKOB, born at Fürth, Bavaria, July 9, 1809, died May 18, 1885. He graduated M.D. at Bonn in 1832; was for a time assistant in the anatomical museum at Berlin, became professor of anatomy at Zürich 1840-44, at Heidelberg 1844-52, and in the latter year accepted a similar professorship at Göttingen. Among his works are: *Ueber Schleim und Eiterbildung* (1838); *Vergleichende Anatomie des Kehlkopfes* (1839); *Pathologische Untersuchungen* (1840); *Handbuch der allgemeinen Anatomie* (1841); *Handbuch der rationalen Pathologie*, and *Handbuch der Systematischen Anatomie*.

HENNEPIN, the county-seat of Putnam county, Ill. It is connected with Chicago by the Illinois River and the Michigan and Illinois canal, and is 114 miles southwest of that city. It contains a flour mill and a planing-mill.

HENNEPIN, LOUIS, a French explorer of America, born at Ath, Belgium, in 1640, died in Holland in 1702. He entered the order of Recollets of St. Francis, and was employed by his brethren to solicit alms at different places—among others at Dunkirk and Calais, where the stories related by the sailors stimulated his desire to visit foreign countries. Afterwards he traveled in Germany and Italy, and was regimental chaplain at the battle of Seneffe, between the Prince of Condé and William of Orange. In 1673 he was ordered to Canada, where he preached for some time at Quebec, and founded a convent at Fort Frontenac. Father Hennepin went first to Niagara with La Salle's expedition (see *Britannica*, Vol. XIV, pp. 318, 319), and took part in navigating Lakes Erie, Huron, and Michigan as far as Mackinaw. Then they sailed down to the Illinois River as far as Peoria, where La Salle built Fort Crèvecoeur. Thence Hennepin set out with two men in a canoe in 1680, descended the Illinois to its mouth, and, after sailing up the Mississippi River for some weeks, fell into the hands of a large party of Sioux Indians, who carried him and his men to their country. Here he discovered and named the Falls of St. Anthony. He spent eight months among the savages. Then Daniel Greysolon de Luht, who had come by way of Lake Superior, rescued him, and enabled him to reach Green Bay by way of the Wisconsin River. Hennepin returned to Quebec in April, 1682, and soon afterwards returned to France, where he published his *Description de la Louisiane, nouvellement Découverte au Sudouest de la Nouvelle France* (1683). He was appointed guardian of the convent of Renty, in Artois, but he soon withdrew to Holland. After laying aside his religious dress he lived in England, where he pub-

lished his *New Discovery of a Vast Country in America* (1698). His last work is *Nouveau Voyage dans un Pays plus Grand que l'Europe entre la Mer Glaciale et le Nouveau Mexique* (1698).

HENNINGSSEN, CHARLES FREDERICK, an English soldier and author, born in England of Swedish parents in 1815. He joined the Carlist army in Spain in 1834, and became colonel of cavalry after the battle of Vielas de los Nevarros. He was afterwards taken prisoner and released on parole. Then he served in the Russian army in Circassia, and afterward joined Kossuth in the Hungarian revolution, becoming commander of the fortress Comorn. Coming to America in Kossuth's interest, he joined in 1856 William Walker in Nicaragua, where he was given command of the artillery. He distinguished himself by his defense of Granada and in the victory of Quesesma. After Walker's surrender to Com. Davis, U. S. N., in 1857, Henningsen returned to the United States. At the outbreak of the civil war he entered the Confederate army as colonel, but was soon afterwards made brigadier-general. He was an able artilleryman. Henningsen published: *Revelations of Russia* (1845); *The White Slave*, a novel; *Eastern Europe*; *Sixty Hours Hence*, a novel of Russian life; *Past and Future of Hungary*; *Personal Recollections of Nicaragua*; and various other works, mostly issued in London. He died in 1877.

HENRY, a village of Marshall county, Ill., situated on the Illinois River and on a railroad, 120 miles south of Chicago. A combined wood and iron bridge spans the river at this point, and here is a lock and dam of the Illinois River Improvement. The village contains a paper mill, a wagon factory, and Marshall College. Pop. (1890), 1,512.

HENRY, CALEB SPRAGUE, an American clergyman and author, born at Rutland, Mass., in 1804. He studied theology at Andover and New Haven, and was ordained as a Congregational minister in January, 1829. He first became pastor at Greenfield, Mass., and then in West Hartford, Conn. In 1835 he took deacon's orders in the Protestant Episcopal church, and was ordained priest in 1836. From 1835-38 he was professor of intellectual and moral philosophy in British College, Pa., and from 1839 to 1852 professor of philosophy and history in the New York University. For some time he also performed the duty of chancellor. He was also rector of St. Clement's church, New York, from 1847 to 1850. During that period he edited the "Churchman," and was also for a year the political editor of the New York "Times." Before this he had founded the "American Advocate of Peace," which soon became the organ of the American Peace Society; also the New York "Review," which he conducted till 1840. Among his many published works we mention: *Cousin's Psychology* (1834), translated from the French; *Compendium of Christian Antiquities*; *Moral and Philosophical Essays*; *Guizot's History of Civilization*, with notes; *Ancient and Modern History*, revised; *Epitome of the History of Philosophy*; *Dr. Oldham at Greystones and His Talk There*; *Social Welfare and Human Progress*; and *Satan As a Moral Philosopher*. He died in 1884.

HENSON, JOSIAH, an American clergyman, born at Port Tobacco, Charles county, Md., in 1787, died in Dresden, Ontario, in 1881. He was a negro, and was born and bred as a slave. Mrs. Harriet Beecher Stowe took his life as the foundation of her novel entitled *Uncle Tom's Cabin*. His arms were crippled as the result of blows from a Maryland overseer. Although he paid \$500 toward purchasing his freedom, yet his master's son took him to New Orleans to be sold. The latter was attacked with yellow fever, and the slave accompanied him back

to Kentucky and nursed him through his sickness. He finally escaped with his wife to Canada, carrying his two children through swamps and thick forests. "Uncle Si," as he was called, settled on Sydenham River near the present town of Dresden and prospered as a farmer. He was also the pastor of a church. When 52 years old he began to read and write. In 1858 he wrote and published an Autobiography. He went three times to England, lecturing and preaching in various cities, and was in 1876 entertained by Queen Victoria at Windsor Castle.

HEPATITIS (Gr. *hepar*, "the liver"), inflammation of the liver.

HEPPENHEIM, an old walled town of Hesse, situated on the Main-Neckar Railway, 16 miles from Darmstadt. It is noted for the excellent wine produced in the vicinity, and for the ruins of the castle of Starkenburg. Population, 5,000.

HEPTAGON, a plane figure of seven sides and seven angles; when the sides and angles are equal the figure is a *regular heptagon*. Geometers have hitherto failed to discover a method of inscribing the heptagon in or of circumscribing it about a circle, and the problem is believed by many to be impossible of solution by the ancient geometry.

HERBARIUM. See *Britannica*, Vol. XI, pp. 715-718.

HERBERT, HILARY A., a United States Congressman, born in 1834. He was admitted to the Alabama bar, and then served in the Confederate army until 1864. He was elected as a Democrat to consecutive Congresses from the 45th to the 52d. In 1893 he became Secretary of the Navy.

HERBERT, SYDNEY, Lord **HERBERT**, of Lea, English statesman, born at Richmond, Sept. 16, 1810, died Aug. 2, 1861. Educated at Harrow and at Oriel College, Oxford, he entered the House of Commons as member for South Wilts, which he represented until his elevation to the peerage in 1861. He was secretary to the admiralty 1841-45, secretary for war 1845-46, 1852-55, and in 1859. He was an able and popular Conservative leader, his army administration being signalized by great improvements in the sanitary condition and education of the army, the amalgamation of the Indian with the royal army, and the organization of the volunteer force. In 1861 he was called to the Upper House under the title of Baron Herbert of Lea. He was heir-presumptive to the 12th earl of Pembroke, and his son became 13th earl in 1862.

HERCULES BEETLE (*Dynastes hercules*), a gigantic lamellicorn beetle from tropical America. The male bears on the thorax an enormous horn, which is met by a shorter upturned horn from the head. The female is without horns, and decidedly smaller. Another species, *D. titigus*, about two inches in length, occurs in the United States. The genus *Megasoma* is nearly allied to *Dynastes*.

HERCULES, PILLARS OF, the name given by the ancients to Calpe (now Gibraltar), and Abyla (now Ceuta), two rocky promontories forming the entrance to the Mediterranean Sea. According to the fable, they were originally one rock, but were torn asunder by Hercules.

HERD-BOOK, a book of record containing the list of pedigrees of cattle of choice breeds.

HEREDITAMENTS, any species of property that may be inherited. See *COPYRIGHT*, *Britannica*, Vol. VI, pp. 256-68; *PERSONAL ESTATE*, Vol. XVIII, pp. 664-65; *REAL ESTATE*, Vol. XX, pp. 304-08; *TITHES*, Vol. XXIII, pp. 410-13.

HEREDITARY RIGHT: strictly speaking, the right of succession, as an heir-at-law. The foundation of this right is nothing but convenience, the principle being that if a man does not by will ap-

point his own heir, the law will do it for him, proceeding according to certain degrees of relationship.

HEREDITY, the general resemblance of children or young animals to one or both of their parents. In some cases this likeness is very close, so that, but for the difference in age, the offspring could scarcely be distinguished from the parent it resembles most. With children this likeness is, however, much less close than with animals. The most generally observed heredity in man is the resemblance in the external structure, comprising the size and shape of the body, the features, complexion, obesity or leanness, and other minor peculiarities. Among the latter may be mentioned the anomaly of six fingers and six toes, which has often been transmitted through several generations; of unusually long canine teeth, etc.

As to the internal structure, we find that the proportions of the bones and the organs of the body are transmissible characteristics. In some families the heart and the main blood-vessels are very large, while they are small in others. Some families are more full-blooded than others. In some the nervous and muscular systems are more developed than in others, and this greater or smaller development runs through many generations. In consequence of this we find certain diseases hereditary in some families, while others are free from them; many families are constitutionally weak in certain organs or tissues, while others are strong. Greater or less fecundity, longevity, immunity from infectious diseases, keenness of sight, hearing, or smell, personal idiosyncrasies, powers of voice, etc., are all transmissible characteristics. There are also on record many cases of the inheritance of special habits, graceful movements, bodily activity, and great muscular strength.

In regard to the intellectual and moral qualities the instances of heredity are too evident and well known to be dwelt upon here. Children resemble their parents very frequently in their passions, propensities, likings or dislikings, in their pride or humility, in their capability and love for music, painting, acting, dancing, etc. The same may be said of their literary or scientific tendency; of their logical, mathematical, and poetical or practical tendencies.

There are also cases on record where lunacy was transmitted through many generations; the tendency to commit suicide has been traced through four generations; and the alcohol habit has been transmitted through entire communities for centuries. Distinctive characteristics—mental as well as bodily ones—of isolated peoples, as the Gypsies, Jews, Chinese, are transmitted through entire nations for thousands of years.

This persistent inheritance of peculiarities cannot be the result of chance. It is altogether too general for that. We find it most strikingly exhibited in the instincts of the lower animals. Ants, bees, beavers, birds, etc., will now build their habitations exactly the same as ants, bees, beavers, birds, etc., built theirs thousands of years ago. The habits, modes of living and the methods of attacking their enemies, or of self-defense, etc., remain forever the same in the same genus of animals. We must, therefore, conclude that heredity is a law of nature.

As to particular phases of heredity, it is impossible that a child should resemble both parents if they are unlike. It will resemble one or the other, or else be intermediate between them in form and character. In most cases it strongly deviates towards one of the parents, and shows a less marked influence of the other. We find that the character-

istics of the father sometimes descend to the son, at other times to the daughter. So the characteristics of the mother reappear as often in her sons as in her daughters. In other, but rarer cases, children resemble one of their grandparents, or even some remoter ancestor. This indirect heredity is called "atavism." There are cases on record where characters have appeared that are traceable to some very remote ancestor. Resemblance to an uncle or aunt occurs once in a long while also. We call this collateral atavism.

When a child is intermediate between its two unlike parents, yet shows the influence of both, this is no exception to the law of heredity, but a proof of it. Sometimes it is very difficult to trace this or that particular characteristic of the child to either of the parents, and then we speak of exceptions to heredity with more justification. These exceptions are apparently as numerous as the accordances. They are partly due to the combined influence of both parents upon the child, since a compound of two unlike elements must necessarily differ from either of the elements. The offspring of two markedly different parents, if it is strongly individualized, cannot resemble either. If the two parents are too greatly unlike in organization, descent, or color, the offspring will very likely be an infertile hybrid. And if they are too much alike in organization and descent, as branches of the same family sometimes are, then the offspring will be defective in some of the mental faculties or in some bodily development. Too much similarity of the parents causes partial arrest of development.

The other general cause of heterogeneity is the acquirement of new habits and mental tendencies during the life of the individual parent. Such newly-gained characteristics are often transmissible, and may produce in the children marked deviations from the general family characteristics. The future parent, even while an embryo in its mother's womb, may be subject to disturbing influences which produce changes even in its structural organization. Many instances are on record where the uterine development of an embryo has been warped so as to produce permanent changes from the family type. Later on we observe individual variations produced by physical and mental influences acting upon the body or mind of a person during his adolescence. These variations are quite marked—much more so than those produced during the maturity of the person.

There are other causes of individual variations and deviations from the family resemblance—causes which act upon the germinal cells of both parents even before the procreation of the offspring. These warping causes are and will remain a mystery. We know only their effects. Thus we find good-sized parents begetting dwarfs, medium-sized parents begetting children who grow into giants, parents of very ordinary intellects begetting children who develop great genius; but in no instance can abnormally great mental powers be traced for more than two or three generations. The descendants of great thinkers and great actors in the world's theater generally return easily to the common plane. The all-powerful influence of heredity makes itself felt in this return to the average condition of mankind. Individuals are incessantly diverging from the normal condition of body or mind, and they often make a lasting mark in history, yet the force of heredity acts in such a way as to straighten out such divergences. Divergent individuals are ever isolated and ephemeral. But their peculiarities may be sustained by close breeding, as it is practiced with domesticated animals,

as horses, cattle, dogs, pigeons, etc. The same thing takes place where peoples are strictly separated into castes or classes; where the members of the nobility, for instance, are not allowed to intermarry with those of the bourgeois or peasant class, the former become gradually thinned out, and physically and mentally degenerated.

National differences in physical and mental characters do not oppose the law of heredity. They are mostly due to the influence of circumstances on individual persons, families and communities, such as climate, food, education, occupation, etc. These influences produce transmissible characteristics, which, by their accumulation through centuries, constitute a new national character or type.

The physical and mental characters of nations are therefore very different. In ancient times a Greek was mentally as different from a Roman as a modern Yankee is now different from a Briton. The physical characteristics of races are very persistent, because heredity acts more vigorously upon the body than upon the mind. A child receives his body complete from his parents, but with respect to his mind he receives only a germ; an undeveloped faculty of thinking and willing. This faculty is very plastic. He must mold it himself and gather his mental stores himself. Yet the germinal mental tendencies are very tenacious, and yield but slowly to transforming influences. The child of a savage can, therefore, not attain the intellectual superiority of a Shakespeare or a Goethe; neither can the average child of a Mongolian, Papuan or Negro attain the intellectual development of an average Caucasian. Heredity is, therefore, an all-pervading agency or force in organic nature, that has produced the racial, national, and family characteristics, but it is counteracted by several opposing agencies which produce divergences from the general types, varieties, species, genera, and individual changes and modifications. While heredity instills an inherent tendency to repeat the characteristics of the parent, these opposing agencies tend to produce characteristics in the offspring not existent in either parent. Heredity alone would produce homogeneity, a tiresome sameness; while the opposing agencies differentiate the general types, and thus produce heterogeneity.

HERING, CONSTANTINE, a German physician, born at Oschatz, Saxony, in 1800, died at Philadelphia, July 23, 1880. Having studied medicine and graduated as M. D., he was engaged in writing a book confuting homeopathy. He read Hahnemann's works, became a convert, and, after personal acquaintance with Hahnemann his admiring friend. The king of Saxony sent him to Surinam to study the flora and fauna of that country. In 1833 he arrived at Philadelphia, where he founded the first homeopathic school in this country. From 1845 to 1869 he filled the chairs of homeopathic materia medica and medicine in this school. He edited several homeopathic papers, as the "Homeopathic Quarterly," the "Homeopathic News," and the "American Journal of Homeopathic Materia Medica." He published many books in both English and German on his favorite doctrine, as the *Rise and Progress of Homeopathy*, *Effects of Snake Poison*, *Condensed Materia Medica*, *Hering's Domestic Physician*, and *American Drug Proving*.

HERITABLE AND MOVABLE, a Scotch lawphrase denoting the distinction of things which go to the heirs and to the executors respectively. Movable include such property as passes to the executor in succession, or is movable by the tenant on leaving his farm, or as comes under the oper-

ation of the law of the owner's domicile in bankruptcy and succession. Money and household furniture may be taken as examples. Heritable subjects are such as go to the heir in succession, or go with land to a buyer, and are regulated by the territorial law. The best examples are land and houses. The gearing of engines and all machinery fixed to the floor are also heritable. Heritable bond, in Scotch law, is a personal bond for a sum of money, with a real right of annual rent payable out of land, and accompanied by a conveyance of the lands themselves in security. The usual deed is now a bond and disposition in security, corresponding to the English mortgage. Heritable securities is the name given, in the law of Scotland, to what in England are called mortgages and charges on land. By the constitution of a heritable security, the debt secured becomes a burden on the land, entitling the creditor to appropriate the rents until the debt is paid. This right of the creditor remains entire against the land, no matter into whose hands it passes. In Scotland the principal heritable security is called the bond and disposition in security, which consists of an obligation to pay the debt, and a disposition to the creditor by way of security till the debt is paid. Power is given to the creditor to sell the estate if the principal or interest is not paid, in which case the creditor must account for the surplus after paying himself the debt.

HERITOR: in the law of Scotland, the owner of land in a parish liable to public burdens. The heritors, collectively, have vested in them the fee of the church and churchyard; they repair the parish church and manse, or rebuild them where necessary.

HERKIMER, the county-seat and a railroad junction of Herkimer, N. Y. It is a thriving village, and has good schools, a flour mill, and a paper mill. Pop. (1890), 3,508.

HERKIMER, NICHOLAS (c. 1725-1777), an American Revolutionary soldier. In 1758 he became lieutenant of militia, and commanded Fort Herkimer, on the Mohawk, during the attack of the French and Indians in that year. In 1775 he became colonel and chairman of the committee of safety of Tryon county, N. Y. A year later he was made brigadier-general in the New York militia. When Colonel St. Leger, sent out by General Burgoyne, besieged Fort Schuyler (now Rome, N. Y.), Herkimer marched to its relief with 800 militia. He proceeded cautiously at first, but his younger officers urged him to proceed more rapidly. As they advanced through a wooded ravine near Oriskany, the British regulars attacked him in front and the Indians on both sides, Aug. 6, 1777. He was soon wounded, but continued to direct the fight for five hours longer. A sortie from Fort Schuyler relieved his men after a loss of 200. He died from the effects of the amputation of his leg. Congress and New York united in erecting a monument to his memory in 1884.

HERKOMER, HUBERT, an English painter, born in 1849. In 1869 he exhibited two pictures in the Dudley gallery, and his success was immediate. His two most popular oil-paintings are *Chelsea Pensioners*, and the companion piece, *Eventide*, the latter showing a group of old women at the work-house.

HERMANN, the county-seat of Gasconade county, Mo., eighty-one miles from St. Louis. It is a noted wine-producing town, and its inhabitants are mostly Germans. Pop. (1890), 1,410.

HERMAN, BINGER, a United States Congressman, born in 1843. In 1866 he was admitted to the Oregon bar, the same year was elected to the legis-

lature, and two years later to the State Senate. In 1868-71 he was deputy collector of United States internal revenue for Southern Oregon, and from 1871 to 1873 was receiver of public moneys at the United States land office at Roseburg. He was a member of the 49th, 50th, 51st, 52d, and 53d Congresses.

HERMETIC BOOKS, the sacred canon of the ancient Egyptians, consisting of forty-two books, divided into six sections. They constitute what is virtually an encyclopædia of Egyptian wisdom, in that they treat of religion, the arts and science. The name "hermetic" comes from Hermes Trismegistus ("Hermes Thrice-greatest"), Greek name of the Egyptian god Thoth, regarded as the originator of Egyptian culture. These books are evidently based upon the Egyptian mythology, but at a time when it was beginning to feel the influence of Hellenistic culture. The Greek and Latin texts of the hermetic books exist only fragmentarily, in the writings of Stobæus, Cyrillus, Suidas and Lactantius. The teachings of Thoth were at first regarded as esoteric doctrines, and as such jealously guarded by the sages, and from them transmitted to their pupils. Thoth was also the inventor of magic and alchemy, whence the latter was sometimes called the *hermetic art*, and whence are derived the terms *hermetic medicine*, *hermetic freemasonry* and *hermetically sealed*.

HERMODACTYL ("Hermes's finger"), a bulbous root, formerly brought from Turkey, and much esteemed as a cathartic, but entirely discarded in modern times. It is probably obtained from *Colchicum variegatum*.

HERNANDEZ-VELASCO, GREGORIO, a Spanish priest and poet, born at Toledo about 1550; translated the *Æneid* of Virgil into Spanish verse (1585). Though the style is rather inflated, the version is correct and presents some elegant passages.

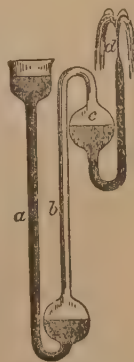
HERNDON, WILLIAM LEWIS (1813-57) an American naval officer, born at Fredericksburg, Va. He served in the American navy and in the Mexican war. In 1851 he was sent to explore the Amazon River. He crossed the Andes from Lima to the headwaters of the Amazon, and then sailed down the river in a canoe. The United States Government published two volumes of Herndon's *Exploration of the Valley of the Amazon*. In 1857 he was captain of the steamer *Central America*, which with 580 persons on board, sailing from Havana for New York, sank in the Gulf-stream. The women and children were saved, but Herndon with 426 men sank with the vessel.

HEROIC AGE: in Greek history or mythology, the age preceding the true historic period. The heroes of that time were regarded by the ancients as intermediate between gods and men, and were venerated much as the saints of Christianity are now. The heroic age furnished abundant material for dramatic and epic poetry of later times, and afforded noble examples of courage, purity and justice.

HEROIC VERSE, the form of verse adapted to heroic or epic poetry. In classic poetry it is the common hexameter verse; in English, German and Italian the iambic of ten syllables; and in French the iambic of twelve syllables.

HERON. See Britannica, Vol. XI, pp. 760-62.

HERO'S FOUNTAIN, a pneumatic apparatus named from its inventor, Hero of Alexandria.



HERO'S FOUNTAIN.

This instrument, through the elastic force of a confined body of air, increased by hydraulic pressure and reacting upon the surface of water in a closed reservoir, produces a jet which may rise above that surface to a height equal to the effective height of the pressing column. An open basin connected with two closed reservoirs on different levels below constitutes the instrument, a simple mode of constructing which is shown in the annexed figure. The column of water in the tube *a* compresses the air in *b*; this presses on the surface of the water in *c*, and causes it to gush out at *d*.

HERRERA, Y CABRERA, DESIDERO (1792-1856), a Cuban writer and educator, born in Havana, Cuba. After studying in his native city he devoted himself to teaching and journalism. He published *Agriensura Cubana, Observaciones Científicas*, which Arago translated into French; *Hurricanes de la Isla de Cuba, Topografía Médica de Cuba, Lecciones de Agriensura*, a treatise on meteorology, and a number of scientific pamphlets.

HERRING. See *Britannica*, Vol. XI, 764-65.

HERRING SILVER, money paid in lieu of supplying a religious house with a certain number of herrings. See *TITHES*, in *Britannica*, Vol. XXIII.

HERRISON: in heraldry, the hedgehog; a charge allusively borne by families of the name of Harris.

HERSCHELL, FARRER, an English statesman, born in 1837. After being educated at the Universities of London and Bonn he became a queen's counsel in 1872, and recorder of Carlisle in 1873. In 1880 he was solicitor-general in Gladstone's ministry, and in 1886 he was raised to the peerage and became lord chancellor. On the appointment of a royal commission to inquire into the working of the metropolitan board of works, Lord Herschell was elected president of this commission. In 1892 he was again lord chancellor.

HERVÉ, AIME MARIE EDOUARD, a French journalist, born May 28, 1835, in the island of Réunion. In 1854 he entered the normal school, but he sent in his resignation shortly afterward, in order that he might devote his undivided attention to journalism. He was connected first with the *Revue de l'Instruction Publique*, and the *Revue Contemporaine*, to which he contributed (1860) the political summary; and he then became editor of the *Courrier de Dimanche* (1863), of the *Temps* (1864), and the *Epoque* (1865). After the publication of the imperial letter of January 19, 1867, inaugurating a new system for the press, M. Hervé established, in conjunction with M. Jean Jacques Weiss, the *Journal de Paris* (1867), which became noted for its persistent attacks on the imperial régime. At the general election of May, 1869, M. Hervé came forward, in the circonscription of Arras, as the candidate of the Liberal opposition, under the patronage of M. Thiers, but he was defeated at the poll by the official candidate, M. Sens. M. Weiss having retired from the strife of political journalism, on being nominated general secretary of the ministry of fine arts, M. Hervé remained sole editor of the *Journal de Paris*, and on February 5, 1873, he started the *Soleil*, a large, political, half-penny newspaper, which, at the outset, was merely an offshoot of the *Journal de Paris*, and conducted by the same literary staff. After the visit of the Comte de Paris to Frohsdorf, which preceded the attempt to reestablish the ancient monarchy, M. Hervé proclaimed loudly "the reconciliation of the House of France," and engaged, with reference to this subject, in an animated controversy with M. Edmond About, the editor of the *Dix-Neuvième Siècle*. This dispute ended in a duel in which M. About was slightly wounded. After the proclamation of the Septen-

nate, M. Hervé supported the policy of the Broglie, Cussy, and Buffet cabinets. On April 28, 1876, M. Hervé announced to the readers of the *Journal de Paris* the discontinuance of that journal, after nine years of a stormy existence; and since then he has remained editor of the *Soleil*.

HERWARTH VON BITTENFELD, KARL EBERHARD, Prussian general, born at Grosswerther, Sept. 4, 1796, died at Bonn, Sept. 2, 1884. He entered the military service in 1811, and gained his first laurels in the war of liberation, especially in the battle of Leipzig. In 1863 he was promoted to the rank of general, and in 1864 commanded the Prussian troops against Denmark, distinguishing himself by his daring capture of the Isle of Alsén. In the campaign of 1866 he was intrusted with the occupation of Saxony, and then with the command of the army which advanced from Saxony into Bohemia. He gained victories at Hühnerwasser and Münchengrätz, and took a prominent part in the battle of Königgrätz. In 1870, on the outbreak of the Franco-German war, he was made governor of the Rhine provinces, and in 1871 a general field-marshal.

HERWEGH, GEORG, German poet and politician, born at Stuttgart May 31, 1817, died at Baden-Baden, April 7, 1875. He studied at Tübingen, was drafted into the army, and subsequently went to Switzerland, where in 1841 he published his successful *Gedichte eines Lebendigen*, a collection of political songs. He returned to Germany in 1842, but soon after incurred the displeasure of the king of Prussia, and was obliged to retire a second time to Switzerland, where in 1843 he published 21 *Bogne aus Schweiz*.

HERZ, HENRI, pianist and composer, born of Jewish parentage at Vienna in 1806, and educated in Paris, where his talent was early recognized. His compositions became popular over Europe, and he was received with applause on visiting England in 1834 and America in 1846. In 1837 he received the decoration of the Legion of Honor, and from 1842 till 1874 he was professor of music at the Conservatory of Paris. He was also manager of a pianoforte factory, and in 1855 his pianofortes won the first prize at the Paris Exhibition. His compositions, more than 200 in number, are mostly for the piano. He died in 1888.

HERZOG, JOHANN JAKOB, German theologian of the Reformed creed, born at Basel, Sept. 12, 1805, died Sept. 30, 1882. He studied theology in his native city and in Berlin, became professor at Lausanne in 1830, at Halle in 1847, and at Erlangen in 1854, retiring in 1877. Among his works are: *Calvin* (1843); *Das Leben Ecolampadii* (1843); *Die Romanischen Waldenser* (1853); but his name is best known for the great theological encyclopædia edited by him, *Realencyklopädie für Protestantische Theologie und Kirche*, 22 vols., 1854-68; new ed. 18 vols., 1877-88; English abridged ed., by Schaff, 3 vols., 1882-4.

HESSE, a grand-duchy of the German empire. Area (1893), 2,965 square miles. Population, 956,611. Capital, Darmstadt. For history, productions and early statistics, see *Britannica*, Vol. XI, p. 780.

The former landgraves of Hesse had the title of grand-duke given them by Napoleon I., in 1806, together with a considerable increase of territory. At the Congress of Vienna this grant was confirmed, after some negotiations. The reigning family are not possessed of much private property, but dependent almost entirely upon the grant of the civil list, amounting to 1,244,488 marks, the sum including allowances to the princes.

The executive is assisted by a ministry, divided at present into three departments, viz.: of the

grand-ducal house and foreign affairs; of the interior and justice; and of finance.

The largest towns of the grand-duchy are: Mayence with a population, in 1890, of 72,281; Darmstadt, 36,503; Offenbach, 35,154; Worms, 25,504; Greissen, 20,611.

Of the population on Dec. 31, 1885, there were, of Protestants, 648,939; Roman Catholics, 278,440; other Christian sects, 7,957; Jews, 26,114; and 161 of no religion.

HESSIAN FLY. See Britannica, Vol. XI, p. 781.

HETEROCERCAL (Gr. *heteros*, "different," "unequal," and *kerkos*, "a tail," a term introduced by Agassiz, to designate the unsymmetrical tail of *Elasmobranchii*, and most ganoid fishes, in which the vertebral axis is bent upwards in the tail, making the upper lobe much the larger—a structure still seen in the sharks and sturgeons. In bony fishes also the axis is somewhat bent upwards in its termination; but the asymmetry is disguised, and the tail looks equal-lobed or homocercal, as in the herring.

HETEROGANGLIATA, a term introduced by Owen and adopted by many zoölogists, in accordance with a scheme of classification founded on the nervous system in animals to designate the mollusca of Cuvier, with which are ranked the "zoophytes" of the division *Polyzoa*, or *Bryozoa*. The nervous centres or ganglia are not arranged in a longitudinal series of symmetrical pairs, but are variously distributed in different parts of the body; one principal ganglionic mass, however, occupying a position above the gullet, with which all the nerves of the special senses are connected.

HETH, HENRY, an American general, born in Virginia in 1825. He was a West Point graduate. When Virginia seceded he was a captain of infantry, but resigned promptly and entered the service of his native State as brigadier-general. In 1863 he was major-general, and commanded a division in General A. P. Hill's corps in Virginia. He fought at Chancellorsville, Gettysburg, and in the campaigns of 1864-65. He surrendered with General R. E. Lee.

HETMAN, or ATAMAN, the title of the head or general of the Cossacks.

HEVES, a town of Hungary, sixty miles east-northeast of Pesh.

HEWES, JOSEPH, a signer of the Declaration of Independence, born in Kingston, N. J., in 1730, and died in Philadelphia, Pa., Oct. 29, 1779. In 1774 he was a delegate to the Continental Congress, and assisted in the preparation of the report on "the statement of the rights of the colonists, the several instances in which these rights are violated, and the most proper means for obtaining their restoration." He belonged to the Society of Friends. When this society denounced the proceedings of Congress he severed his connection with it, and became even a promoter of war. In 1776 he was one of the signers of the Declaration of Independence, and was at the head of the naval committee. Hewes declined a reelection, in 1777, but resumed his seat in Congress in 1779.

HEWIT, NATHANIEL AUGUSTUS, an American clergyman, born at Fairfield, Conn., in 1820. He studied theology at East Windsor, Conn., and in 1843 was ordained deacon in the Protestant Episcopal church. While holding a charge in North Carolina he became a Roman Catholic, and was ordained in that church in 1847 by Bishop Reynolds. Hewit was thereupon appointed vice-principal of the Charleston Collegiate Institute. He joined the order of the Redemptorists in 1850; and in 1853, on the foundation of the congregation of St. Paul by Father Hecker, Hewit became one of

its chief members, taking the religious name of Augustine Francis. In the Paulist Seminary in New York city he was professor of philosophy, theology and Holy Scriptures since 1865. From 1869 till 1874, he edited the "Catholic World." He has been active as an author, and has published *Reasons for Submitting to the Catholic Church*; *Life of Princess Borghese*; *Problems of the Age*; *Light in Darkness*; *The King's Highway*; and many other works.

HEWITT, ABRAM STEVENS, an American statesman, born at Haverstraw, N. Y., in 1822. After graduating at Columbia College he studied law and was admitted to the bar in 1845. His impaired eye-sight made him soon give up the practice of law, and he became associated with Peter Cooper in the manufacture of iron. The firm Cooper & Hewitt now own and control the Trenton, Ringwood, Pequest and Durham iron works. He was a commissioner to the French exhibition of 1867, and made a report on "iron and steel." He married Peter Cooper's daughter, and has been secretary of the Cooper Union for the Advancement of Science and Art since its incorporation in 1859. Hewitt was elected to Congress in 1874 as a Democrat, and served continuously, with the exception of one term, until 1886. He advocated moderate tariff reform. In 1886 he was elected mayor of New York city. In this office he enforced the laws strictly, and held the heads of the departments strictly accountable. In 1887 Columbia College gave him the degree of LL.D. on account of his expert knowledge in the manufacture of iron.

HEXACHORD: in modern music, denotes the six diatonic degrees of which Guido formed his scale.

HEXAHEDRON, a solid figure bounded by six faces—the cube being one.

HEXAMETER, the name applied to the most important form of classical verse. It is the heroic or epic verse of the Greeks and Romans, the grandest examples of which are the *Iliad* and *Odyssey* in Greek and the *Æneid* in Latin. It consists of six feet, or measures, the last of which must be a spondee (a measure composed of two long syllables), and the penultimate a dactyl (one long syllable and two short). If the penultimate is also a spondee, the verse is said to be spondaic. Klopstock, Goethe and Voss have produced admirable specimens of hexameter verse in German, and it has become familiar in English through Longfellow's *Evangeline*. The following lines from the last show the only varieties of the hexameter which are endurable to the ear—that is, those in which the accent on each foot falls on its first syllable:

Felt she in | myriad | springs her | sources | far in the |
mountains.
Stirring, col | lecting, | heaving up | rising | forth out | flow-
ing.

It will be observed that on whatever syllable here the metrical accent falls, that syllable is precisely the same which the voice naturally accentuates. Whether this was the case in ancient Greek and Latin hexameters we do not know; but, if the present system of Greek accentuation represents the natural accent of Homeric words, Homer disregarded the natural accents, or did not observe our rule of always placing the metrical accent on the first syllable of each foot; and we still pronounce Latin hexameters by preserving what we take to be the natural accent of each word, whether that corresponds to the metrical accent or not. Thus, in the line—

Itali | am fa | to profu | gus La | viniaque | venit,

we disregard the metrical accent, which should

fall on the first syllable of each foot (and actually does so on the fifth and sixth), and in reading the line give effect to the natural accents only, as we conceive them, to the words *Italian, futo, profugus*.

When English hexameters were first written they were constructed in the same manner; the natural accent, except in the last two feet, overruled the metrical. In the following lines from Stanihurst's translation of the *Æneid*, it will at once be seen that the effect is absurd if we read the lines as modern English hexameters are read:

Either here | are crouch | ing some | troops of | Greekish as- |
semble,
Or to crush | our bul | warks this | work is | forged, all-
houses
For to pry, | surmount | ing the | town; some | practice or
other
Here lurks | of cun | ning; trust | not | this | treacherous en-
sign.

If we read by the natural accent, the effect is rough and harsh to the ear; if by the modern metrical, ridiculous and absurd. Such are the limitations of the hexameter in English.

HEYSE, PAUL JOHANN, German author, born in Berlin, March 15, 1830, educated there and at Bonn. He was one of the band of authors whom King Max of Bavaria gathered around him in Munich in 1854. He has published more than a score of collections of novelettes under various titles, good specimens of which are contained in *Das Buch der Freundschaft* (1883-84). His poetic works include narrative poems, such as *Urica*, 1852; and epics, such as *Die Braut von Cypern*, 1856; and *Thekla*, 1858. As a dramatist he has been a voluminous writer of dramas, but few if any of his dramatic pieces have been unequivocally successful. He has also written a couple of more ambitious novels, *Die Kinder der Welt*, (1873), and *Im Paradiese* (1875), which have been very popular; and has translated the poetical works of Giusti, of Leopardi, and of Parini, Monti and Manzini.

HEYWARD, THOMAS, JR. (1746-1809), an American statesman, born in South Carolina. He studied law in the Temple in London. After returning home he was elected to the Continental Congress of 1775, and became one of the signers of the Declaration of Independence. In 1778 he was appointed judge of the criminal and circuit court of South Carolina. At the siege of Charleston, May 12, 1780, he commanded a battalion of volunteers, and on the surrender of the city was taken prisoner and sent to St. Augustine, Fla., where he was confined one year. After his release he resumed his office as State judge. In 1790 he was a member of the constitutional convention, and then retired to his plantation.

HIAWATHA, a city and county-seat of Brown county, Kan., 40 miles west of St. Joseph, Mo. Pop. (1890), 2,486.

HICKMAN, a city and county-seat of Fulton county, Ky., on the Mississippi River. Pop. (1890), 1,652.

HICKOK, LAURENS PERSEUS (1798-1888), an American clergyman and philosopher, born at Bethel, Conn. After studying theology he became successively pastor at Newton, Kent and Litchfield, Conn., from 1822 to 1836. In the latter year he was appointed professor of theology in the Western Reserve College, and in 1844 professor of the same branch in the Auburn Theological Seminary. In 1852 he removed to Schenectady, N. Y., to become professor of mental and moral science and vice-president of Union College there. From 1860 to 1866 Dr. Hickok

was president of the same college. At the age of seventy Dr. Hickok retired (1868) to Amherst, Mass., where he devoted himself to philosophical studies. He published *Rational Philosophy* (1848); *System of Moral Science*; *Empirical Psychology*; *Rational Cosmology*; *Creator and Creation*.

HIDALGO, F. COSTILLA, was born in Mexico, May 8, 1753, and died in Chihuahua, July 30, 1811. He studied at Valladolid, and in 1779 went to the city of Mexico, where he became a priest. In December, 1809, a conspiracy was formed at Valladolid against the Spanish government of Mexico; of this Hidalgo was a member. After some preliminary disturbances, Hidalgo issued a declaration of independence to the people of Suevato. With about 1,000 men he marched on San Miguel; his numbers were greatly increased by armed people, gathered from the country districts. Arriving at Celaya, Hidalgo was elected general-in-chief. With an irregular body of about 50,000 followers, promiscuously armed, his force invaded Guanajuato, stormed the place, and, in accordance with the fashion of Indian warfare, massacred the inhabitants. After establishing a canon-foundry and mint, he marched against Valladolid, and occupied it without much resistance. Many of his plundering followers deserted, and on December 2d, Hidalgo began his retreat. On the 7th his body of troops and pillagers were attacked near Acula by General Callega, and the greater part dispersed. Hidalgo then took refuge in Valladolid. Here he organized a government, and prepared to resist the Spanish forces. On January 17, 1811, 6,000 Spanish troops attacked the mob of 100,000 armed natives, and won a complete victory. On July 29th Hidalgo, who, before this, had been excommunicated by the Roman church, was degraded from his sacerdotal character, and executed on the following day.

HIGGINS, ANTHONY, a United States Senator, born in 1840. He was admitted to the Delaware bar in 1864, and in the same year was appointed deputy attorney-general. From 1869 to 1876 he was United States Attorney for Delaware, and in 1889 took his seat in the United States Senate as a Republican. His term of service expires March 3, 1895.

HIGGINSON, FRANCIS, a New England clergyman, born in England in 1588, died in Salem, Mass., in 1630. He was a Puritan preacher of great influence in Leicester, England. In 1628 he was invited by the Massachusetts Bay Company to accompany its expedition to New England. He arrived at Salem on June 29, 1629, and was soon after chosen teacher of the congregation. He drew up a confession of faith which was assented to by 30 persons. During the ensuing winter he was attacked by a fever which disabled him, and finally caused his death. He wrote *New England's Plantation*, or *A Short Description of the Commodities of that Country* (1630).

HIGGINSON, THOMAS WENTWORTH, an American author, born at Cambridge, Mass., in 1823. He studied theology at the Divinity School at Cambridge, and was ordained Congregational pastor at Newburyport, Mass., in 1847. He preached and worked against slavery. This did not suit his congregation, and he resigned his charge in 1850. In 1852 he became pastor of a free church at Worcester, Mass. In 1853 he attempted to rescue a fugitive slave from the custody of the United States Marshal in Boston, and was wounded in the face. As a man had been killed in his attack on the courthouse Higginson was indicted for murder, but escaped finally through a flaw in the indictment. In 1856 he went to Kansas, and was conspicuous in the movement to make it a free State.

On the outbreak of our civil war he was made a captain in a Massachusetts regiment. In November, 1862, he became colonel of the 1st South Carolina volunteers, the first regiment of former slaves mustered into the service of the United States. With this regiment (afterward the 33d United States colored infantry) he made various expeditions in South Carolina and Florida; but he was wounded in 1863, and compelled to retire in October, 1864. Living at Cambridge, Mass., he was elected to the State legislature in 1880, and has since been a member of the Massachusetts State Board of Education. Higginson has published *Out-Door Papers*; *Harvard Memorial Biographies*; *Malbone, An Oldport Romance*; *Army Life in a Black Regiment*; *History of the United States*; *Common Sense About Women*, advocating woman suffrage; and many other works on social and historical topics.

HIGH CHURCH and **LOW CHURCH**, two ecclesiastical parties in the Church of England, and in the Protestant Episcopal church. The terms are used exclusively as adjectives. The high churchmen emphasize the doctrine of the Apostolic succession, and attach much importance to ceremonies and symbols in worship. Low churchmen usually reject the peculiar tenets of the high-church school, and emphasize the spiritual doctrines of the Gospel, while they make but little of ecclesiastical rules.

HIGHLAND, a city of Madison county, Ill. It has a Roman Catholic university, woolen and flour mills, and a foundry. Many Germans and Swiss reside here. Pop. (1890), 1,857.

HIGHLAND REGIMENTS, regiments originally raised in the north of Scotland. There are nine in the British army, of whom five wear the national costume. The first Highland regiment, the "Black Watch," was organized in 1739. See *ARMY*, *Britannica*, Vol. II, p. 580.

HIGH-LEVEL BRIDGE, at Halifax, England, opened in 1890, was built to provide railway accommodation for the upper part of the town, which is 400 feet higher than the station of the Lancashire and Yorkshire Railway. The line ascends in a ruling gradient of one in fifty with sharp curves, and several deep cuttings; there are also a tunnel of 820 yards, a viaduct of ten spans of 50 feet each, and a number of bridges. The total length is three and one-half miles, and there are two stations. The cost was £300,000.

HIGH MISDEMEANOR, an offense closely bordering on treason. See "Cognate Offenses," under *TREASON*, *Britannica*, Vol. XXIII, pp. 528-29.

HIGH SEAS, the open sea, including the whole extent of sea, not the exclusive property of any particular country. The rule of international law is that every country bordering on the sea has the exclusive sovereignty over such sea to the extent of three miles from its shores, all beyond being common to all countries. The part of the sea within three miles distance is generally called the territorial sea of the particular country, or *mare clausum*. The distinction has little effect on the right of navigation, but as regards fishing it is otherwise. See *FISHERIES QUESTION*, in these Revisions and Additions.

HIGHTSTOWN, a post-borough of Mercer county, N. J., fourteen miles northeast of Trenton. It contains three educational institutions, and manufactories of plows, chains, and doors. P., 1,875.

HIGHWAYMEN, robbers who attack passengers on the public road. Famous English highwaymen were Claude Duval, Swift Nick Newson (hanged at York in 1684), Dick Turpin and his comrade, Tom King, and Jerry Abershaw. The best known

"romances of the road" are W. H. Ainsworth's *Rookwood* and Lord Lytton's *Paul Clifford*.

HIGHWAYS. For general article on *HIGHWAYS*, see *Britannica*, Vol. XI, p. 810. In American countries, and generally on the continent of Europe, the "rule of the road" requires that in passing, both in riding and in walking, the *turning shall be to the right*. In Great Britain and Ireland, "carriages" in passing are required to *pass to the left* and "walkers" *to the right*. The following English couplets express the rule in quaint verse:

The Rule of the Road is a paradox quite;
For in driving your carriage along,
If you bear to the left, you are sure to go right,
If you turn to the right, you go wrong.

But in walking the streets 'tis a different case:
To the right it is proper to steer;
On the left there should be enough of clear space
For the people who wish to walk there.

HILDRETH, RICHARD, was born in Deerfield, Mass., June 22, 1807. He was admitted to the bar in 1830, and became connected with the Boston *Atlas* and other newspapers. For a number of years he was engaged on newspapers in Demerara, and in 1861 he became United States consul at Trieste, Austria. Among his most notable works were the *White Slave*, an anti-slavery novel, and a history of the United States in six volumes.

HILDRETH, SAMUEL PRESCOTT, born in Massachusetts, September 30, 1783; graduated in medicine at Andover, and removed to Ohio in 1806. He was for many years a contributor to leading scientific magazines, his special subjects being meteorology and geology. Doctor Hildreth died in 1863.

HILGARD, EUGENE WOLDEMAR, an American chemist, born at Zweibrücken, Bavaria, in 1833. He studied at the Royal Mining Academy in Freiberg, Saxony, at the Universities of Zürich and Heidelberg. In 1857 he became assistant State geologist of Mississippi, and in 1857 he was appointed chemist in charge of the laboratory of the Smithsonian Institution, and filled also the chair of chemistry in the National Medical College at Washington. From 1858 to 1866 he was State geologist of Mississippi, and till 1873 also professor of agricultural chemistry in the State University there. In 1873 Hilgard was called to the chair of geology and natural history in the University of Michigan, and in 1875 he accepted the professorship of agricultural chemistry and botany in the University of California, where he since remained. During 1881-83 he had charge of the agricultural division of the northern transcontinental survey.

HILGARD, JULIUS ERASMUS, an American engineer and scientist, born at Zweibrücken, Bavaria, in 1825. From 1843 to 1845, he studied civil engineering at Philadelphia. In the latter year he became one of Alexander D. Bache's assistants on the coast survey, and soon rose to the office of assistant in charge of the bureau at Washington. This place he held until the death of the superintendent in 1881, when he was appointed to fill the vacancy. Hilgard had also charge of the United States standard weights and measures, and in 1872 he was made a delegate to the international metric commission which met at Paris. In 1885, on the advent of Cleveland's administration, he was suspended and then permitted to resign. Professor Hilgard's work in terrestrial physics, geodesy, the magnetic survey of the United States, tidal action in harbors, etc., and his papers and lectures on these topics are of considerable scientific importance. Died in 1891.

HILL, AMBROSE POWELL, an American soldier, born in Culpeper county, Va., in 1825, died near Petersburg, Va., in 1865. He graduated at the United States Military Academy in 1847, served as lieutenant of artillery during the Mexican war, and was engaged in Florida against the Seminoles in 1849-50. When Virginia seceded, in 1861, Hill went with it and was appointed colonel of the 13th regiment of Virginia volunteers. After the battle of Bull Run he was promoted brigadier-general, and fought as such in the battle of Williamsburg, in May 1862, with such a spirit that he was made a major-general. He took part in the seven days' battles around Richmond, and was at the second battle of Bull Run. At the battle of Fredericksburg he held the right of Jackson's force, and repulsed the attack of Meade. At Chancellorsville, in May, 1863, he participated in Jackson's daring march and unexpected assault on Howard's division. After Jackson's death he became lieutenant-general, fought at Gettysburg, and in 1865 commanded the city of Petersburg during its siege. On April 2, of the same year, while reconnoitering, Hill was killed by a rifle shot.

HILL, BENJAMIN HARVEY, an American statesman, born in Jasper county, Ga., in 1823, died at Atlanta, Aug. 16, 1882. He practiced law successfully in La Grange, Ga., from 1845 to 1861. When his state seceded he was elected to the Confederate Senate at Richmond, where he remained till the close of the war. In 1875 he was elected to the United States Congress, but resigned on being chosen United States Senator in 1877.

HILL, CHARLES AUGUSTUS, a United States Congressman, born in 1833. He was admitted to the Illinois bar in 1860, and in 1862 entered the Union army, serving until the close of the war. In 1868 he was chosen State's attorney for the counties of Will and Grundy, and was elected as a Republican to the 51st, 52d and 53d Congresses.

HILL, DAVID B., United States Senator from New York, a lawyer, born in Havana, Vt., Aug. 29, 1844. He received a common-school and academic education; removed to Elmira, N. Y., and entered the profession of law. In politics he is a Democrat, and in 1865 was elected city attorney of Elmira; was elected a member of the State assembly in 1871 and 1872; was afterward elected mayor of Elmira. In 1882 was elected lieutenant-governor of the State of New York on the ticket with Grover Cleveland; became governor when Mr. Cleveland resigned to become President of the United States; was elected governor in 1885, and re-elected in 1887. In 1891 he was elected by the State legislature to the United States Senate, to succeed William M. Evarts.

HILL, DANIEL HARVEY, an American general, born in South Carolina in 1821. After graduating at West Point in 1842 he served through the Mexican war, resigned in 1849, and was made professor of mathematics in Washington College, Va., and in 1859 president of the military institute at Charlotte. On the outbreak of the civil war he became colonel of the 1st North Carolina volunteers and took part in the fight at Big Bethel, Va., in June, 1861. He then rose to the rank of major general, and commanded a division during the seven days' fight around Richmond in June, 1862. Afterwards he fought at South Mountain, Antietam, Fredericksburg and Chickamauga. At the close of the war Gen. Hill returned to Charlotte, N. C., where he published a monthly magazine, "Field and Farm"; and subsequently "The Land We Love"; also *Elements of Algebra*; *The Crucifixion of Christ*; and *Consideration of the Sermon on the Mount*.

HILL, THOMAS, an American clergyman and educator, born at New Brunswick, N. J., in 1818. He studied theology at Cambridge, and was ordained pastor at Waltham, Mass., in 1845. From 1859 to 1868 he was successively president of Antioch College and of Harvard College. In 1868 he resigned on account of bad health. Then he became botanist of the Hassler expedition around the coast of South America under Prof. Agassiz (1871). In 1872 he was pastor of a church at Portland, Me. Hill has published *Geometry and Faith*; *Liberal Education*; *True Order of Studies*; *Jesus the Interpreter of Nature*; *Natural Sources of Theology*, and some elementary mathematical books.

HILLIARD, HENRY WASHINGTON, an American statesman, born in Cumberland county, N. C., in 1808. He was admitted to the bar at Athens, Ga., in 1829, and appointed professor in the State University of Alabama in 1831. In 1838 he was elected to the legislature as a whig, and in 1842 President Tyler sent him as United States Minister to Belgium. From 1845 to 1851 he sat in Congress. At the outbreak of the civil war he went with the South, and held the nominal rank of brigadier-general in the Confederate army. After the war he resumed the practice of law at Augusta, and afterward at Atlanta. From 1877 to 1880 he was United States Minister to Brazil. Hilliard published a volume of speeches in 1855, and a novel.

HILO, an important seaport of Hawaii, situated on Byron Bay, an inlet on the east coast of the island. It is the second town in size in the Sandwich Islands, and has a spacious and commodious harbor. Population, 4,231.

HILLSBORO, a city and county-seat of Montgomery county, Ill., 66 miles northeast of St. Louis, Mo., on the Indianapolis and St. Louis Railroad. Pop. (1890), 2,000.

HILLSBORO, a post-village and county-seat of Orange county, N. C., 40 miles northwest of Raleigh. It has several tobacco factories and a military academy.

HILLSBORO, a city and county seat of Highland county, Ohio, 60 miles east of Cincinnati. It contains several educational institutions, banks, churches, factories, scale and agricultural works, and mills, and publishes several weekly papers. It is connected with Sardinia by 17 miles of narrow-gauge railroad, and is the terminus of a branch of the Marietta and Cincinnati railroad.

HILLSBOROUGH, a port of entry of Albert county, N. B., on Petitcodiac River. It has a good harbor, and exports gypsum and gas coal (albertite) to the United States.

HILLSBOROUGH, a post village of New Hampshire, in county of the same name, situated in the Contoocook Valley. It contains woolen mills, bedstead factory and shovel handle shops.

HILLSBOROUGH RIVER, or **Mosquito River**, in Volusia county, Fla., is a salt-water lagoon, a continuation of Halifax River, extending 30 miles south of Mosquito Inlet. It is separated from the ocean by a narrow strip of land, and was formerly called Mosquito South Lagoon.

HILLSDALE, a city and county-seat of Hillsdale county, Mich., 177 miles east of Chicago. It is the seat of Hillsdale College, and has a chair factory, machine shops, foundries and flour mills.

HILL STATES, a number of small principalities of India on the east side of the Upper Sutlej, comprising about 10,000 square miles and about 550,000 inhabitants. With the exception of this aggregate name they have but little in common with each other.

HILTED, a term used in heraldry to indicate the tincture of the handle of a sword.

HINCKS, SIR FRANCIS, a Canadian statesman, born at Cork, Ireland, in 1807, died in 1885. He settled at Toronto in 1832, when he entered politics and edited the "Examiner." After being elected to the Dominion Parliament, in 1841, he was appointed inspector-general. In 1851 he became prime minister of Canada, and held this post till 1854. The next year he was made governor of the Windward Islands, and in 1860 governor of British Guiana, where he remained till 1866. After returning to Canada he assisted in uniting the British provinces into the "Dominion of Canada." In 1869 Hincks was knighted. From that time till 1873, he was the finance minister of Canada.

HIND, JOHN RUSSELL, English astronomer, born at Nottingham, May 12, 1828. At an early period he became interested in the study of astronomy, and in 1840 obtained a situation in the Royal Observatory at Greenwich, where he remained till June, 1844. He was then sent as a member of the commission appointed to determine the exact longitude of Valentia, and on his return entered Mr. Bishop's observatory, Regent's Park, London. Here he calculated the orbits and declination of more than seventy planets and comets, noted a number of new movable stars, and between 1847 and 1854 discovered ten minor planets. In 1851 Hind obtained from the Academy of Sciences at Paris the Lalande medal and was elected a corresponding member, and in the following year received the gold medal of the Astronomical Society of London and a pension of £200 a year from the government. In 1853 he undertook the editing of the *Nautical Almanac*. His scientific papers were generally published in the *Transactions* of the Astronomical Society, in the *Comptes-Rendus* of Paris, and the *Astronomische Nachrichten* of Altona. He became president of the Royal Astronomical Society in 1880.

HINDMAN, THOMAS C., a Confederate general, born in Tennessee in 1818, died Sept. 27, 1863. In the Mexican war he served as lieutenant of Mississippi volunteers. During 1859 and 1860 he was in Congress. On the outbreak of the civil war he was made a brigadier-general in the Confederate army. He served first under General S. B. Buckner in Kentucky, and commanded afterwards at Memphis. He fought at the battle of Shiloh, was made a major-general, and assigned to the chief command in Arkansas. At Chickamauga he commanded a division in General Polk's army. He was killed at Helena, Ark., by one of his former soldiers.

HINGHAM, Mass., a manufacturing town of Plymouth county, fourteen miles southwest of Boston. Fancy knit goods, wooden ware, cordage, bagging, furniture, iron castings and worsted upholstery are made here. Pop. (1890), 4,564.

HINSDALE, a post-village of Cheshire county, N. H. It has good water-power, and among its manufactures are woolen goods, lumber and mowing machines. Pop. (1890), 2,258.

HINSDALE, BURKE AARON, an American educator and author, born at Wadsworth, Ohio, in 1837. In 1861 he became a minister of the Christian (or Campbellite) church; was pastor of a church at Solon (1864), and afterwards at Cleveland till 1868. Then he was made professor of history and English literature in Hiram College, and was its president from 1870 to 1882. Hinsdale has published: *Authenticity of the Gospels; Evolution of the Theological Systems of the Ancient Church; Life and Works of President Garfield; Schools and Studies*, etc. Hinsdale was also assistant editor of the "Christian Standard," and "Christian Quarterly," for many years.

HIP in architecture, the rafter at the angle where two sloping roofs meet. A roof is called a

hipped roof when the end is sloped upwards so as to form a hip on each side.

HIP-KNOB, an ornament carved in stone or wood, set on the apex of a gable or hipped roof, and forming a kind of finial.

HIPPARION, a genus of fossil horses. See horse, Britannica, Vol. XII, p. 174.

HIPPEAU, CELESTIN, a French author and educationist, born at Niort, Deux-Sèvres, May 11, 1803, died in 1883. His earlier studies were pursued in his native city, and he subsequently held positions as professor at Poitiers, Napoléon, Vendée, Strasburg, Paris and Caen. He received the decoration of the Legion of Honor in 1861. Among the most prominent of his writings are: *Histoire de l'Abbaye de Saint-Etienne de Caen, 1066-1790* (1855); *Histoire du Gouvernement de la Normandie* (1863-73); and *Avènement des Bourbons au Trône d'Espagne* (1875).

HIPPOCRAS (*vinum Hippocraticum*, "wine of Hippocrates"), an aromatic medicated wine, formerly much used as a cordial. It was prepared from white wine, flavored with cinnamon and other spices, lemon peel, almonds, etc., and sweetened with honey or sugar.

HIPPOCRATIC OATH, an engagement entered into by persons commencing the practice of medicine. The text of the oath has been ascribed to Hippocrates, and may, perhaps, be accepted as genuine; its comparative antiquity is not denied. It is the oldest and one of the best of the codes of medical ethics.

HIPPOGRIFE, or **HIPPOGRYPH** (Gr. *hippos*, "a horse," and the word *gryph*, "griffin"), a fabulous animal, unknown to the ancients, which is represented by modern writers as a winged horse with the head of a griffin. The hippogriff figures as the horse of the Muses, and plays a conspicuous rôle in the *Orlando Furioso* of Ariosto.

HIPPOPHAGY, **HIPPOPHAGI** (Gr. "eaters of horse-flesh"), was a name given by the Greeks to a Scythian people living northeast of the Caspian Sea, and to a Sarmatian tribe north of the Euxine. In some parts of Europe horse-flesh is a regular and wholesome article of diet. In 1866 the sale of horse-flesh in the Paris markets as an article of food was officially recognized and regulated, and during the siege of Paris, horse-flesh was gladly eaten by all who could get it. In Great Britain an act was passed in 1889 regulating the sale of horse-flesh, requiring that all horse-flesh exposed for sale should be expressly so described.

HIPPURIC ACID, $C_7H_5NO_3$, a compound of great interest to chemist and physiologist. It derives its name from its having been first discovered in the urine of the horse, and that fluid, or the renal secretions of the cow, affords the best and readiest means of obtaining it. The crystals of hippuric acid are moderately large, colorless, but subsequently becoming milk white, four-sided prisms, which are devoid of odor, but have a faintly bitter taste. They dissolve readily in boiling water and in spirit. It is an abundant normal constituent of the urine of the horse, cow, sheep, etc., and probably is to be found in the urine of all vegetable feeders. In the urine of healthy persons living on an ordinary mixed diet it occurs in very small quantity, but it is increased by an exclusively vegetable diet and in the well-known disease diabetes. The hippuric acid occurring in the animal organism exists in combination with bases, and chiefly as hippurate of soda and hippurate of lime. The last-named salt can be obtained by the mere evaporation of the urine of the horse, hippuric acid readily splits into benzoic acid and glycocoll. If benzoic acid is administered it is ex-

creted as hippuric acid, combining with glycocholic acid in the body. In herbivorous animals the benzoic acid is largely derived from the food; in animal feeders, even in starvation, it occurs in small amount in the urine; and it is therefore concluded that its forerunners may be derived from the metabolism of the tissues. That certain bodies closely allied to benzoic acid may be so formed has now been experimentally demonstrated, while glycocholic acid can also be proved to be so produced. At one time the belief was entertained that these bodies were combined in the liver; but more recent search has shown that the synthesis chiefly takes place in the kidneys.

HIPPURITES, a remarkable genus of fossil bivalves, peculiar to the Cretaceous strata, and so abundant in some of the Lower Chalk beds of the Pyrenees that the series has received the name of hippurite limestone. The external form of the shell is so anomalous that some have called the genus a coral, others an annelid, others a barnacle, and so on, though the majority held it to be at least a mollusk. Investigation has shown that the hippurites were divergent bivalves. The right valve is very large, and elongated into a cone, while the left valve is inconspicuous and perforated by radiating canals. Including allied genera or sub-genera—for example, *Radiolites* and *Caprinella*—there are over a hundred species, all restricted to the Chalk and Chalk-marls.

HIRSCH, MORRIS BARON DE, a Hebrew capitalist and philanthropist, born in Bavaria. Originally a cattle merchant he gained a considerable amount of wealth, and then associated himself with the European banking-house of Bischoffsheim & Goldsmidt. A large portion of his fortune was made by his connection with the railroad leading from Buda-Pesth, in Hungary, to Varna, on the Black Sea. Baron Hirsch has founded and maintained many schools in Egypt, and in European and Asiatic Turkey, and in 1890 established in the United States the fund, known as the Hirsch Fund (*q. v.*) for the help of needy Hebrew immigrants. The Baron is a resident of Paris, France.

HIRSCH FUND, THE, was created by Baron Hirsch, of Paris, France, who executed, before the American Consul in February, 1891, a trust deed to a board of trustees in New York city, conveying to them \$2,400,000, to be invested in the United States, and the net income (estimated to be \$10,000 a month) to be loaned to needy Hebrew immigrants from Russia and Roumania, who have come to this country within two years. Baron Hirsch, during the year 1890, contributed \$10,000 monthly for the benefit of such Hebrew families. The specific purpose of the fund is to furnish mechanics with tools, teach them easy trades, pay their entrance fees into trades-unions, and, in exceptional cases, to lend the immigrants small sums to help them to become self-supporting. Day-schools and night-schools for children and adults are to be founded where the local authorities have made no provision for them. There are two clerks whose duty it is to look up Hebrew children who cannot attend the public schools on account of not being able to speak English. No money will be lent to peddlers, and the smallest amount will be \$5. During the last six months of 1890 the trustees of this fund provided situations in New York City for 2,888 immigrants.

HISCOCK, FRANK, a United States Senator, born in 1834. He was admitted to the New York bar in 1855, and from 1860 to 1863 served as district attorney of Onondaga county. He was a member of all the Congresses from the forty-fifth to the fifty-third inclusive, and in 1887 took his seat in the United

States Senate as a Republican. His term of service expired March 3, 1893.

HITCHCOCK, ETHAN ALLAN (1798-1870), an American general and author, born at Vergennes, Vt. After graduating at West Point in 1817, he was assistant instructor in tactics there till 1829, and from that time till 1833 he was commandant of cadets. In the Mexican war he was inspector-general under Scott. Becoming colonel in 1851, he was placed in command on the Pacific coast. When the civil war broke out he was appointed major-general of volunteers in the Union army in February, 1862, and soon afterwards made commissary-general of prisoners. He retired from service in October, 1867, and died at Sparta, Ga., Aug. 5, 1870. Among his published writings are: *The Doctrines of Swedenborg and Spinoza Identified*; *Alchemy and the Alchemists*; and *Christ the Spirit*.

HITCHCOCK, ROSWELL DWIGHT (1817-87), an American theologian, born at East Machias, Maine. He studied theology at Andover, and was ordained pastor of the first Congregational church at Exeter, N. H., in 1845. Afterward he spent a year at the Universities of Halle and Berlin in Germany. In 1852 he was professor of natural and revealed religion at Bowdoin College; in 1855 professor of church history in Union Theological Seminary, New York; and in 1880 he became president of that seminary. In 1866 he visited Italy and Greece; in 1869 Egypt and Palestine, and in 1885 he again went abroad. Doctor Hitchcock published a *Complete Analysis of the Bible*, and edited the *Life and Writings of Edward Robinson*. He received the degree of D.D. from Bowdoin College in 1855, and of LL.D. from Williams College in 1873.

HITT, ROBERT ROBERTS, a United States Congressman from Ohio, born in 1837. From 1874 to 1881 he was first secretary of legation at Paris, and *chargé d'affaires ad interim*; was assistant Secretary of State in 1881, and in 1882 was elected to the 47th Congress. He was reelected to the 48th, 49th, 50th, 51st, 52d and 53d Congresses as a Republican.

HIVITES ("villagers," or "midlanders"), a Canaanitish people, the main body of which lived in the region from Lebanon and Hermon to Hamath, but who had colonies, apparently isolated, in southern Palestine, as at Gibeon.

HOAR, EBENEZER ROCKWOOD, an American jurist, born at Concord, Mass., in 1816. He was admitted to the bar in 1840. In 1849 he became judge of the court of common pleas, but resigned in 1855. Soon after he was appointed a judge of the Supreme Court of Massachusetts, and held this office until 1869, when President Grant appointed him Attorney-General of the United States. Mr. Hoar was a member of Congress from Washington from 1873 to 1875.

HOAR, GEORGE F., a United States Senator, born in 1826. He was admitted to the Massachusetts bar in 1848, and in 1860 was city solicitor of Worcester. In 1852 he was a member of the State house of representatives, and of the State senate in 1857. He was a member of the 41st, 42d, 43d and 44th Congresses, and in 1877 took his seat as a Republican in the United States Senate. In 1883 and 1889 he was reelected.

HOAR, SAMUEL, an American statesman, born at Lincoln, Mass., in 1773, died at Concord, Mass., in 1856. Being admitted to the bar in 1805, he soon became eminent in his profession. He was a member of Congress in 1835-37, and a State councillor in 1845-46. The State of Massachusetts sent him to South Carolina in 1844, to test the constitutionality of acts of the latter State, by which free negro sailors were seized and imprisoned on entering its

ports. But on December 5th, of the same year, he was driven from Charleston by a mob, and the State Legislature authorized the governor on the same day to expel him from the State.

HOBART, JOHN HENRY, bishop in the Protestant Episcopal Church, born at Philadelphia in 1775, died at Auburn, N. Y., Sept. 10, 1830. He studied theology in 1796-98, while he was a tutor at Princeton College. He was ordained deacon in 1798; priest in 1801; assistant rector of Trinity Church, New York, in 1812, and rector in 1816. In the latter year he became bishop of New York, and in 1821 professor of pastoral theology and pulpit eloquence in the General Theological Seminary of New York.

HOBART PASHA, the Honorable Augustus Charles Hobart Hampden, third son of the Earl of Buckinghamshire, born at Waltham-on-the-Wolds, in Leicestershire, April 1, 1822, died at Milan, June 19, 1886. He entered the British navy in 1836, served first against the slavers in Brazilian waters, then in the Baltic in the Crimean war, and at the outbreak of the civil war in America became known as the commander of a blockade-runner. In 1867 he entered the service of Turkey, and for his distinguished services in checking the Greek blockade-runners to Crete, was raised to the rank of pasha, and 1874 made admiral of the Ottoman fleet. He commanded the Turkish Black Sea fleet in 1878, and was in 1881 made Turkish marshal.

HOBHOUSE, JOHN CAM, English statesman, born June 27, 1786, died June 3, 1869. He was educated at Cambridge, entered parliament in 1820 as an advanced Liberal and was successively Irish secretary, commissioner of woods and forests, and president of the board of control. He was created Baron Brough-ton in 1851.

HOBOKEN, a city and port of entry of Hudson county, N. J., on the west bank of the Hudson River, opposite New York City, and immediately above Jersey City. It has an extensive trade in coal, being one of the principal depots from which New York and its shipping are supplied, and three lines of European steamships start from this port. The principal industries of the place are connected with these steamships and the coal docks. Population, 1870, 20,297; 1880, 30,999; 1890, 43,561.

HOCHHEIM, a town of Prussia, in Hesse-Nassau, on the right bank of the Main, three miles east of Mainz. Here is produced the white wine known as *Hochheimer*.

HOCHKIRCH, or HOCHKIRCHEN, a village in Saxony, a few miles east by south from Bantzen, was the scene of a battle between the Austrians and Prussians, Oct. 14, 1758, during the Seven Years' war.

HODGE, CHARLES, an American theologian, born in Philadelphia, Dec. 28, 1797; graduated at Princeton College in 1815; in 1822 appointed professor in the Princeton Theological Seminary, where he remained till the close of his life. He was founder and long the editor of the *Princeton Review*; and besides numerous essays, etc., he was the author of commentaries on Romans, Corinthians, and Ephesians, of a history of the Presbyterian Church in America (1840), and of the well-known *Systematic Theology*, now a standard work of the Calvinistic churches. He died June 19, 1878.

HODGE, ARCHIBALD A., born in Princeton, N. J., July 18, 1823; died there in 1886. He graduated at Princeton in 1841, spent three years as a missionary in India, 1847-50, and was afterward in charge of parishes in Maryland, Virginia and Pennsylvania. He became editor of the *Princeton Review*, and in 1878 was elected professor of didactic and polemic theology in Princeton Theological Seminary, to succeed his father.

HODGKINSON, EATON, engineer, born in Chesh-

ire, Feb. 26, 1789. At the age of twenty-one he overturned the theories of Tredgold, at that time the principal authority on iron beams. In 1847 he was appointed professor of the mechanics of engineering in University College, London. He cooperated in the construction of the Britannia bridge. He died June 18, 1861.

HODSON, MAJOR WILLIAM STEPHENS RAIKES, English soldier, was born at Maisemore Court, near Gloucester, March 19, 1821. Choosing the life of a soldier, he joined the Indian army in 1845. From 1849 to 1852 Hodson was employed in the work of civil government in the Punjab. Then, being made commandant of the Guides corps, he did excellent service on the turbulent frontier. But in 1856 he was deprived of his command on account of irregularities in the regimental accounts and of his unjust treatment of the troops and natives under his authority. In the crisis of the mutiny, however, he was appointed head of the intelligence department in the army engaged before Delhi, and was commissioned to raise a new regiment of irregular cavalry, which became known as "Hodson's Horse." With this body of men Hodson took part in the siege of Delhi and in the subsequent operations down to the siege of Lucknow. After the fall of Delhi, Hodson discovered the Mogul sovereign and his sons; these last he shot dead with his own hand at the time of capture. He himself was shot on March 11, 1858, during the assault on a royal palace in Lucknow, and died on the following day.

HOE, RICHARD MARCH, born in the city of New York, Sept. 12, 1812; was the son of an English printer, who came to this country in 1803, and who invented the printing press known by his name. The son improved upon the invention of the father, and to his efforts are due the manifold improvements which the power press has received. Mr. Hoe died in Italy, June 7, 1886.

HOFFMAN, DAVID, an American jurist, born at Baltimore, in 1784, died suddenly at New York, Nov. 11, 1854. He was an eminent lawyer, and in 1817 became professor of law in the University of Maryland.

HOFFMANN, CHARLES FENNO, an American author, born at New York City, in 1806, died at Harrisburg in 1884. When he was eleven years old his leg was crushed, and had to be amputated above the knee. After studying law at Columbia College he was admitted to the bar in 1827. In 1833 he was the chief editor of the "Knickerbocker Magazine." After a trip through the West he wrote *A Winter in the West*, and *Wild Scenes in the Forest and the Prairie*, and a novel, *Greyslaer*. He also wrote poetry. The first volume is called *The Vigil of Faith*, and the second, *Borrowed Notes for Home Circulation*. A mental disorder, which attacked him in 1849, closed his literary career.

HOFFMANN, AUGUSTUS WILHELM, a German chemist, born at Giessen, April 8, 1813. After obtaining the degree of doctor of philosophy, he became assistant to Liebig in the laboratory at Giessen; and, on the establishment of the Royal College of Chemistry in London in 1845, he was made superintendent of the new institution. From 1856 to 1865 he was chemist to the royal mint, and in 1865 accepted an appointment as professor of chemistry in the University of Berlin. He has made important discoveries in chemistry (see ANILINE, *Britannica*, Vol. II, p. 48), and has contributed numerous papers to the transactions of scientific societies—for the most part on the highest departments of organic chemistry. At Liebig's death he became editor of the "Annalen der Chemie." He was ennobled on his seventieth birthday, in 1888.

HOGG, QUINTIN, a distinguished English philan-

thropist, was born in February, 1845. He has taken a special interest in the education of homeless boys, young mechanics and artisans in London. In 1873 he started an institute for this purpose which consisted of only one room and a few members. In 1893 the membership had increased to over 12,000. The work of this "Polytechnic" is of a threefold character—social, educational, and religious.

HOGSHEAD, an old English measure of capacity no longer in use, but equivalent for wine to sixty-three gallons, for ale and beer to fifty-one gallons. In the United States the word now signifies a large cask.

HOHENZOLLERN, LEOPOLD, PRINCE OF, is the eldest son of the late Prince Charles Antoine of Hohenzollern-Sigmaringen, and was born Sept. 22, 1835. He was educated in the universities of Bonn and Berlin. He succeeded his father on June 2, 1885. The prince is an hereditary member of the Chamber of Seigneurs of Prussia, a general of Prussian infantry in the suite of the first regiment of footguards and a chevalier of the order of the Black Eagle. Prince Hohenzollern is best known in connection with his candidature for the throne of Spain, his pretensions to which became the ostensible cause of the late Franco-Prussian war.

HOLACANTHUS, a genus of fishes of the family *Chatodontidae*, remarkable for the beauty and symmetry of their colors, and for their excellence as articles of food. They have the compressed form and other general characteristics of the *Chatodontidae*, a single dorsal fin, and a large spine on the gill-cover. They are natives of the seas of warm climates. *H. imperator* is one of the esteemed fishes of the East Indies, rivaling the salmon in flavor.

HOLBROOK, JOHN EDWARDS, an American naturalist, born at Beaufort, S. C., in 1794, died at Norfolk, Mass., Sept. 8, 1871. After receiving his degree of M. D. from the University of Pennsylvania, he went to Europe to continue his medical studies there, especially at Paris. In 1824 he was made professor of anatomy in the Medical College of South Carolina, which position he held for more than 30 years. During the civil war he served as surgeon in a South Carolina regiment.

HOLDEN, a railroad junction of Johnson county, Mo., where timber, building-stone and coal are to be obtained in abundance. Pop. (1890), 2,520.

HOLDEN, EDWARD SINGLETON, astronomer, was born in St. Louis, Mo., Nov. 5, 1846. He studied at West Point, and subsequently held several positions in the army as instructor in mathematics and philosophy. In 1881 he became professor of astronomy in the University of Wisconsin and director of the new Washburn observatory, where he remained with brief intermissions until 1886, and published four volumes of observations. In 1883 he visited the Caroline Islands to observe a total eclipse of the sun. At the end of his engagement in Wisconsin he was chosen president of the University of California, and director of the Lick observatory on Mt. Hamilton, San José.

HOLDER, JOSEPH BASSETT (1824-88), an American zoölogist. In 1860 he entered the United States army, and was surgeon-in-charge at the United States military prison in Tortugas, Fla., until 1867, and then was assistant post-surgeon at Fortress Monroe, Va. In 1870 he was made curator of invertebrate zoölogy, ichthyology, and herpetology in the American museum of natural history, New York.

HOLIDAY, a holy day; a day set apart in commemoration of some historical event, or in honor of some person; a religious or secular festival, on which business is legally suspended, and the time spent in relaxation and amusement.

In the Latin countries, almost every Saint's day in the calendar is observed as a holiday. As these are very numerous, the loss to those engaged in manufacturing industries and business pursuits is a very serious one. In Great Britain many of the holidays observed in this country are also legal holidays, with the exception of the 4th of July and Thanksgiving. There has been within the last few years a growing agitation in the United States looking to the establishment of additional public holidays, and a growing tendency to recognize, during the summer months, the afternoons of Saturdays as a time to be devoted to the recreation of the masses. This "early closing movement" has become widely extended and has met with much encouragement from many of the largest mercantile and business firms in the most populous centers.

The following is a list of holidays in the United States, with the place of their observance:

JAN. 1. NEW-YEAR'S DAY: In Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin, Washington and Wyoming.

JAN. 8. ANNIVERSARY OF THE BATTLE OF NEW ORLEANS: In Louisiana.

JAN. 19. LEE'S BIRTHDAY: In Georgia and Virginia.

FEB. 10, 1891. MARDI-GRAS: In Alabama and Louisiana.

FEB. 22. WASHINGTON'S BIRTHDAY: In Alabama, California, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Carolina, Texas, Utah, Virginia, Wisconsin, Washington and Wyoming.

MARCH 2. ANNIVERSARY OF TEXAN INDEPENDENCE: In Texas.

MARCH 4. FIREMEN'S ANNIVERSARY: In New Orleans, La.

MARCH 27, 1891. GOOD FRIDAY: In Alabama, Louisiana, Maryland, Pennsylvania and Tennessee.

APRIL 1, 1891. STATE ELECTION DAY: In Rhode Island.

APRIL 21. ANNIVERSARY OF THE BATTLE OF SAN JACINTO: In Texas.

APRIL 26. MEMORIAL DAY: In Alabama and Georgia.

MAY 10. MEMORIAL DAY: In North Carolina.

MAY 20. ANNIVERSARY OF THE SIGNING OF THE MECKLENBURG DECLARATION OF INDEPENDENCE: In North Carolina.

MAY 30. DECORATION DAY: In California, Colorado, Connecticut, Dakota, Iowa, Illinois, Indiana, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Utah, Vermont, Wisconsin, Washington and Wyoming.

JULY 4. INDEPENDENCE DAY: In all the States.

SEPT. 7, 1891. LABOR DAY: In Colorado, Connecticut, Iowa, Massachusetts, Nebraska, New Jersey, New York, Ohio and Pennsylvania.

NOVEMBER —. GENERAL ELECTION DAY: In Arizona, California, Kansas, Indiana, Maryland, Missouri, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, South Carolina, Rhode Island, Tennessee, Texas, Washington, Wisconsin and Wyoming. In the States which hold elections in November, 1891, election day falls on the 3d instant.

NOV. 26, 1891. THANKSGIVING DAY: It is observed in all the States, though in some it is not a statutory holiday.

DEC. 25. CHRISTMAS DAY: In all the States, and in South Carolina the two succeeding days in addition.

Sundays and Fast Days (whenever appointed) are legal holidays in nearly all the States.

ARBOR DAY is a legal holiday in Idaho, Kansas, and Wyoming, the day being set by the Governor, in Nebraska, April 23d, and in Colorado on the third Friday in April (April 17, 1891). Arbor Day is also a legal holiday in Rhode Island, on a day set by the Governor, but does not affect the payment of notes, etc.

In Minnesota, Washington's Birthday and Memorial Day are the only general holidays expressly provided by law. As to the maturity of bills and notes, the following days are by implication holidays: Thanksgiving Day, Good Friday, Christmas, January 1st and July 4th; as to schools, Christmas, January 1st, July 4th and Thanksgiving Day.

In New Mexico there are no legal holidays established by statute, and in Delaware no State holidays.

The birthday of Abraham Lincoln, February 12, is a legal holiday in Illinois.

There is no national holiday, not even the Fourth of July. Congress has at various times appointed special holidays, but there is no general law on the subject. The proclamation of the President designating a day of Thanksgiving only

makes it a holiday in those States which provide by law for it.

HOLLAND, see *Britannica*, Vol. XII, pp. 59-98; also *NETHERLANDS*, in these Revisions and Additions.

HOLLAND, city of Ottawa county, Mich., in Holland township, containing banks, churches, schools, Hope College and iron-smelting furnaces, mills and tanneries. The town is largely populated by Hollanders, and four weekly newspapers in Dutch are published. Pop. (1890), 3,945.

HOLLAND, JOSIAH GILBERT, an American journalist and author, born at Belchertown, Mass., July 24, 1819, died in New York city, Oct. 12, 1881. After graduating at Berkshire Medical College, Pittsfield, Mass., he became superintendent of public schools at Vicksburg, Miss. In 1849 Doctor Holland was associate editor of the "Springfield Republican," and later he edited *Scribner's Magazine*.

HOLLIDAYSBURG, the county-seat of Blair county, Pa., on a branch of the Juniata River, and at the junction of several branches of the Pennsylvania railroad. It has furnaces, foundries, rolling-mills, and nail factories. Pop. (1890), 2,975.

HOLLISTER, the county-seat of San Benito county, Cal., 94 miles south of San Francisco. Much tobacco is raised in the vicinity, while coal and quicksilver are found in the surrounding mountains. Pop. (1890), 1,234.

HOLLISTON, a manufacturing town of Middlesex county, Mass., 26 miles southwest of Boston. It produces boots, shoes, nails, wrenches, and pumps.

HOLLINGSHEAD, JOHN, born in London, Sept. 9, 1827. He joined the staff of *Household Words* in 1857; was a constant contributor to that periodical and to *All the Year Round*, the *Cornhill Magazine*, *Good Words*, and *Once a Week*. From 1859 to 1864 he published several volumes of essays and stories, chiefly on life in London. He has written one or two original dramatic pieces, and was for ten years the dramatic critic of the *Daily News*, *London Review*, etc., and is a member of the Dramatic Authors' Society. Mr. Hollingshead opened the Gaiety Theater, in the Strand, in Dec., 1863, and he has only lately ceased to be its lessee and manager. He has had three metropolitan theaters under his direction at one time, with the most powerful combination of actors in London. He has also been the director of the principal theater in Manchester. In 1879 he induced the whole Comédie Française to visit London and play for six weeks at the Gaiety.

HOLLY, a post-village and railroad junction of Oakland county, Mich., 52 miles from Detroit. Ice is shipped from here, the manufactures are furniture, flour, and castings. Pop. (1890), 1,266.

HOLLY SPRINGS, a city, railroad junction and county-seat of Marshall county, Miss., noted for its educational institutions. Rust University and the State normal school and other schools are located here. It is a great cotton shipping point, and manufactures hubs, spokes, wagons, and contains potteries and marble works. Pop. 2,246.

HOLMAN, WILLIAM S., a United States Congressman, born in 1822. He was admitted to the Indiana bar, and from 1843 to 1846 was judge of the court of probate. From 1847 to 1849 he was prosecuting attorney; was a member of the legislature in 1851, and was a judge of the court of common pleas from 1852 to 1856. He was a Democratic member of the successive Congresses from the 36th to the 53rd, except the 45th and 46th.

HOLM OAK, or HOLLY OAK, a beautiful evergreen oak, *Quercus ilex*, native of Southern Europe and Northern Africa. It affords excellent timber.

HOLMES, ABIEL (1763-1837) an American clergyman. In 1783 he became tutor at Yale, and in 1785 was made pastor in Midway, Ga. From 1792

to 1832 he had charge of the first parish in Cambridge, Mass. He wrote *Annals of America* (1805).

HOLMES, GEORGE FREDERICK, an American educator, born in 1820. He was a teacher in Virginia, Georgia and South Carolina, and in 1842 was admitted to the South Carolina bar. In 1845 he became professor in Richmond College, Va.; in 1846 president of Mississippi University; in 1847 professor of political economy, history and international law in William and Mary College, and in 1857 was made professor of history and literature in the University of Virginia. He has written a series of text books used in Southern schools.

HOLMES, OLIVER WENDELL, M.D., was born at Cambridge, Mass., August 29, 1809. He graduated at Harvard College in 1829, and began the study of law, which he abandoned for that of medicine. Having attended the hospitals of Paris and other European cities, he began practice in Boston in 1836; in 1838 was elected professor of anatomy and physiology in Dartmouth College, and in 1847 was appointed to a similar professorship in the Massachusetts Medical School, from which he retired in 1882. As early as 1836 his contributions in verse appeared in various periodicals, and his reputation as a poet was established by the delivery of a metrical essay, entitled *Poetry*, which was followed by others in rapid succession. As a writer of songs, lyrics, and poems for festive occasions, he occupies the first place. He was for many years a popular lecturer. In 1857 he began, in the *Atlantic Monthly*, a series of articles under the title of *The Autocrat of the Breakfast Table*, which were followed in 1860 by *The Professor at the Breakfast Table*; in 1872 by *The Poet at the Breakfast Table*, and in 1885 by *The New Portfolio*. In addition he has published *Astræa* (1850); *Currents and Counter-Currents in Medical Science* (1861); *Elsie Venner, a Romance of Destiny* (1861); *Borderlands in Some Provinces of Medical Science* (1862); *Songs in Many Keys* (1864); *Soundings from the Atlantic* (1864); *Humorous Poems* (1865); *The Guardian Angel* (1868); *Mechanism in Thought and Morals* (1870); *Songs of Many Seasons* (1874); *John L. Molley, a Memoir* (1878); *The Iron Gate and Other Poems* (1880); *Medical Essays* (1883); *Pages from an Old Volume of Life* (1883); *Ralph Waldo Emerson* (1884); *A Moral Antipathy* (1885), and numerous poems recited at various reunions and dinners. In 1886 he visited England, where he was received with great cordiality. Editions of his collected poems have appeared from time to time, the first in 1836, the last in 1881.

HOLST, HERMANN EDUARD VON, a German historian, born in Fellin, Livonia, in 1841, and emigrated to the United States in 1869. In 1872 he became professor of history in Strasburg University, and in 1874 at Freiburg. Subsequently he returned to the United States, and lectured at Johns Hopkins University. He wrote *Louis XIV* (1869); *Verfassung und Demokratie der Vereinigten Staaten von Amerika* (1873); and *The Constitutional Law of the United States of America*.

HOLSTERS, cases for pistols affixed to the pommel of a saddle. They were frequently covered with wool or fur, to prevent injury to the rider in the event of his being thrown forward upon them.

HOLSTON RIVER, a branch of the Tennessee, formed by the north and south forks, which rise in Virginia and unite near Kingsport, Tenn. It flows southwest to Kingston, where it unites with the Clinch. It is about 200 miles in length, and is navigable for light-draft boats the entire distance, and for large steamers to Knoxville during the greater part of the year.

HOLT, JOSEPH, an American jurist, born in 1807.

He was admitted to the Kentucky bar in 1828; in 1857 was appointed commissioner of patents; became postmaster-general in 1859, and in 1860 assumed charge of the war department. In 1862 he was made judge-advocate-general of the army, and in 1864 was put at the head of the bureau of military justice. In 1865 he was brevetted major-general, United States army, for faithful, meritorious and distinguished services in the bureau of military justice during the war, and in 1875, at his own request, was retired.

HOLTON, a city and county-seat of Jackson county, Kan., 56 miles west of Leavenworth. It manufactures flour, and has excellent fruit, good timber and building stone. Pop. (1890), 2,727.

HOLTZENDORFF, FRANZ VON, a German jurist, born at Vietmannsdorf, in Brandenburg, Oct. 14, 1829. Educated for the law, he practiced in the courts at Berlin till 1857, when he became a lecturer on law at the University. Made professor there in 1861, he was in 1873 called to Munich. He is known as an able writer on several branches of law, and especially as an advocate for the reform of prisons and penal systems.

HOLTZMANN, ADOLF, born at Carlsruhe, May 2, 1810, died at Heidelberg, July 3, 1870. He first studied theology at Berlin, then Old German under Schmeller at Munich, and afterwards Sanskrit under Burnouf at Paris. In 1852 he was appointed professor of German language and literature at Heidelberg.

HOLTZMANN, HEINRICH JULIUS, theologian, son of the Germanist Adolf Holtzmann, born at Carlsruhe, May 17, 1832. In 1861 he became extraordinary, in 1865 ordinary, professor of theology at Heidelberg, and in 1874 accepted a call to the theological faculty at Strasburg.

HOLY COAT OF TREVES. See TREVES, Britannica, Vol. XXIII, p. 553.

HOLY CROSS, the name of several orders of the Roman Catholic church, as the Congregation of Canons Regular of the Holy Cross, founded by Theodore de Celles in 1211; Congregation of the Holy Cross, an association of regular clerks, founded by the Abbé Moreau in 1834, and introduced into the United States in 1842. The parent house of this order for the entire world has since been planted at Notre Dame, Indiana.

HOLY FAMILY, the name given, in the language of art, to every representation of the Infant Saviour and His attendants. In the early part of the Middle Ages, when the object in view was to excite devotion, the Virgin and Child were usually the only persons represented. At a later period, Joseph, Elizabeth, St. Anne (the mother of the Virgin), and John the Baptist were included.

HOLYHEAD ISLAND, a small island forming part of Anglesey, Wales, is eight miles long by three and a half broad. It is separated from Anglesey by a narrow strait, crossed by a causeway, along which run the Holyhead road and the Chester and Holyhead Railway. The surface is mostly rocky and barren. On the northwest coast are two islets, the North and South Stacks, the latter with a lighthouse, whose light is seen for twenty miles. Area, 9,658 acres. Population (1893), 10,131.

HOLY LEAGUE, a name applied to various European alliances, as that of 1511, between the Pope, Julius II., Spain and Venice against France, or that of Nuremberg in 1538, between Charles V. and the Catholic princes of Germany against the League of Schmalkald. For the league of 1576 against the Huguenots, see FRANCE, Britannica, Vol. IX, p. 562.

HOLYOAKE, GEORGE JACOB, an English re-

former, born at Birmingham, April 13, 1817. He taught mathematics at the Mechanics' Institute in his native city, acted as secretary to the British contingent that went to the assistance of Garibaldi; was for many years editor of "The Reasoner"; was chiefly instrumental in securing the passage of the bill legalizing secular affirmations, and has taken a prominent part in various public movements. Holyoake was the last person imprisoned in England on a charge of atheism, 1841. He was president of the Carlisle Congress of the Coöperative Societies, 1887.

HOME, DANIEL DOUGLAS, born near Edinburgh, Scotland, March 20, 1833; died June 21, 1886. He came to the United States in 1840. In his youth he claimed to have had spiritualistic visions, and at seventeen years of age published himself as a medium. In 1853 Home went to New York to study medicine. He finished his course, but did not practice. Later he removed to London, where he remained for several years giving spiritualistic seances, and exhibited his art in Russia, Germany, Italy and France. In 1858 he married a Russian lady of wealth and station. In 1863 Home went to Italy to study art, and in 1866 a Mrs. Lyons made over to him \$165,000 with the proviso that he should add "Lyons" to his name. Some years afterward the donor demanded the return of her gift; Home refused compliance, the case came to trial, and was decided in favor of the plaintiff. In 1871 he married another Russian lady, but the union proved unhappy. Thereafter Home gradually retired from public view, and died insane.

HOMEOPATHY. The membership of the American Institute of Homeopathy, on Jan. 1, 1891, numbered nearly one thousand, and represented nearly every State in the Union. The number of new members received during the previous year was 128. At that date the statistical summaries were reported as follows: Number of physicians (variously estimated), 10,000 to 12,500; colleges, 13; students in attendance last year, 1,175; number graduated last year, 369; alumni of 13 colleges, 8,422; professors and lecturers, 254; value of college property, \$750,000; State societies, 29; aggregate membership, 3,080; local societies, 90; aggregate membership, 4,543; hospitals, general and special, 62; total number of beds, 5,897; patients treated last year, 35,242; value of hospital property, \$6,950,700; journals published, 25.

While at one time in Great Britain and on the continent of Europe, homeopathy had fallen into such disrepute that practitioners in that school of medicine were not infrequently denounced as quacks and regarded almost everywhere with suspicion, yet of late years the principles of Hahnemann, its founder, have met with increasing recognition not only by the public, but in professional circles. The later works of Hahnemann have in a measure supported the claim of scientific medical men that he proceeds upon unscientific and involved hypotheses; but his appeal to the lay public met with such a response that the protests of dissentient physicians have been drowned in the general voice of approval. As the literature of homeopathy has increased, a revival of interest in the use of drugs has followed, and during the last twenty years the method of studying the action of drugs originally suggested and carried out by Hahnemann has been adopted to a very large extent, under the designation of pharmacology; while for practical purposes the uses of drugs proposed by homeopaths, and set forth in their journals and published works, have been very largely followed. The United States, however, has been the especial field where homeopathy has been

fostered and encouraged, and mainly on account that in this country public opinion is more powerful than professional jealousy. Here, it is estimated that nearly one-fourth of the qualified practitioners of medicine practice it. The figures given at the head of this article generally evidence its flourishing status.

HOMER, a city of Champaign county, Ill., 273 miles southwest of Toledo, Ohio. It has a flour mill and is a shipping point for fruit and grain. Pop., 917.

HOMER, a railroad junction of Calhoun county, Mich., with a furnace and flour mills. Pop., 1,063.

HOMER, a village of Cortland county, N. Y., 27 miles south of Syracuse. It contains foundries and flour mills. Pop. (1890), 2,500.

HOMER, WINSLOW, an American artist, born in 1836. In 1860 he became interested in painting, and has since devoted his entire attention to that work.

HOMESTEAD, a flourishing town of Alleghany county, Pa., the center of a considerable iron-working industry. Late in the spring of 1892 it was brought into prominence by a bloody riot, growing out of an extended strike of iron-workers, in which several lives were sacrificed. Population (1890), 7,919.

HONDURAS, **BRITISH**, a crown colony on the Caribbean Sea, south of Yucatan, and 600 miles west from Jamaica. Area, 7,562 square miles. Population in 1891, 31,471. Capital, Balize, with a population of 5,800. Balize is noted for its production of mahogany and logwood. Schools (1891), 34; pupils, 2,612 (1,086 Roman Catholic, 1,199 Wesleyan); government grant, \$11,023. Detachments of the 2d West India regiment are stationed in the colony.

Imports in 1890, £282,045; exports, £287,690; revenue, £51,204; expenditures, £45,487.

Chief sources of revenue: Customs-duties, excise, licenses, land-tax, etc.; also sale and letting of crown lands. Expenditure mainly administrative and the various services. Debt (1890), £17,595.

In 1890 mahogany exported 5,500,000 cubic feet; logwood, 20,018 tons; fruit (chiefly to New Orleans), £25,000; sugar, 953 tons. The transit trade greatly increases the traffic of the ports, especially in India rubber, sarsaparilla, coffee, etc. Besides the staple products, mahogany and logwood, there are sugar, coffee, bananas, plantains, cocoa-nuts, etc.

In 1890, tonnage of vessels entered and cleared, 364,067.

Number of letters, newspapers, etc., passed through the post-office, 1887—international, 97,355; inland, 22,697.

Currency, chiefly Central American silver dollars.

HONDURAS, **THE REPUBLIC OF**, was established Nov. 5, 1838, before the dissolution of the confederation of Central America in 1839. It is governed under a charter proclaimed in 1865, greatly modified by the new constitution of Nov. 1, 1880. It gives the legislative power to a congress composed of 37 members. The executive authority rests with a president, nominated and elected by popular vote for four years. Area about 46,400 square miles. Population (1889), 431,917. The capital of the Republic is Tegucigalpa, with 12,600 inhabitants.

The finances of the country are in great disorder, owing to prolonged civil strife, aggravated by wars with Guatemala and San Salvador. The revenue for 1888-89 was \$1,432,522; expenditure, \$1,385,000. The foreign debt of Honduras consists of English loans amounting to £3,222,000 and a French loan of £2,176,670, or a total of £5,398,570. No interest has been paid since 1872, and its accumulation has reached (1891) the amount of over £7,645,518. The finances of Honduras have become fur-

ther complicated by a bloody revolution in the summer of 1892. The disturbed condition of affairs precludes anything like accuracy concerning its exports since 1888, which in that year were valued at \$3,350,664. In 1890, there were 50 post-offices, 1,800 miles of telegraphs, and there is a railway from Puerto Cortez to San Pedro Sula, 37 miles, and an inter-oceanic railway is projected from Puerto Cortez to Amapala on the Pacific. Also a line from Puerto Cortez by the North Coast, through one of the best fruit districts of the Republic.

HONDURAS, **BAY OF**, an inlet of the Caribbean Sea, between Yucatan and Guatemala on the west, and Honduras on the south.

HONES, or **WHETSTONES**, a particular class of stones used for the purpose of sharpening edge-tools, such as knives, scythes, etc. The best are those brought from Turkey; Bohemia is also celebrated for its hones; and excellent ones are found in Persia, in the Hartz Mountains, in Styria, in Spain, Peru, Siberia, and in this country. In Great Britain, several localities yield hone-stones of excellent quality, and none better than the celebrated Water-of-Ayr stone, which is much used for polishing copper-plates, as well as for hones. The Welsh oil-stone or Idwall stone, and the cutler's green-stone, are obtained from Snowdon in Wales; and in the neighborhood of Tavistock, the Devonshire oil-stones are procured. The hones used for sharpening scythes, etc., are usually made of coarse-grained sandstone.

HONESDALE, an important agricultural and manufacturing city on the Lackawaxen River, is the county-seat of Wayne county, Penn. Population, 6,000.

HONEY-BUZZARD, or **BEE-KITE** (*Pernis apivorus*), one of the *Falconidae*, allied to kites and buzzards. It has a thick feathering on the sides of the head down to the base of the bill; it winters in Africa, and breeds in the wooded districts of North Europe, ranging, however, as far east as China and Japan. The honey-buzzard plunders the nests of bees and wasps for the larvæ, and also the honey. The nest is situated on some leafy tree; and the eggs, usually two, are laid in June. The genus includes a few other species.

HONEYCOMB MOTH, or **BEE-MOTH**, a moth of the genus *Galleria*, which infests beehives. There it deposits its eggs, and the larvæ when hatched feed on the honeycomb. There are two broods in the year, and the latter pupæ sleep through the winter. The best known species are *G. Ceranea* and *G. alvearia*. It appears that neither moths nor larvæ are ever stung by the bees. When they occur in numbers they are very injurious or even quite fatal to the hive.

HONEY-DEW, a viscid, saccharine exudation, often found in warm, dry weather on the leaves and stems of trees and herbaceous plants. It is often, but not always, associated with the presence of insects which feed on the juices of plants, and its flow is ascribed to their punctures; but the rupture of the tissues from any other cause seems also to produce it, and warm dry weather seems to produce in the sap that superabundance of sugar which is thus thrown off. Aphides themselves exude a fluid called honey-dew, which probably differs considerably from the direct exudation of the plant, but mingles with it where they abound. Different kinds of manna are the dried honey-dew of certain plants. But generally this exudation, as it dries, coats the surface of leaves and branches with a clammy film, on which molds and other small fungi soon grow, and thus the pores of the plant are clogged and its health is impaired. Gardeners are therefore careful

to wash off honey-dew. Orange and lemon plantations sometimes suffer great injury from the abundance of honey-dew, as have the coffee plantations of Ceylon.

HONG-KONG, a crown colony of Great Britain, and formerly a part of China. For history, government and early statistics, see *Britannica*, Vol. XII, pp. 141, 142. The latest reported official census was that of 1881; but an estimated census of Dec. 31, 1889, gave the following figures: Area, 29 square miles. Population, 194,482. Of the colored population there were 130,168 Chinese, one-third of the latter being British subjects by birth. The governor has an annual salary of \$32,000, including a "table allowance" of \$7,000. In 1889 there were 106 schools (subject to government supervision) with 7,659 pupils, involving an annual expenditure of \$53,902; also 107 private schools, with 2,022 pupils. The revenue in 1889 amounted to \$1,823,549, and the expenditure to \$1,459,167; the public debt, to about \$1,000,000. There was an imperial garrison of 1,300. Hong-Kong is the headquarters of the China squadron, consisting of 25 vessels in 1890. The number of vessels entering that port in 1889 was 3,820 of 451,864 tons.

HONOLULU, the capital of the Hawaiian or Sandwich Islands, is situated on the southern coast of the island of Oahu. It is at once the seat of government and the commercial center of the Hawaiian kingdom; but it was not originally the capital, and its importance is of modern growth, being due to the fact that its harbor is the only really well-protected port in the Archipelago. See *HAWAII* in these Revisions and Additions.

HOOD, JOHN BELL, an American general, was born at Owingsville, Kentucky, 1st June 1831, graduated at West Point in 1853, and saw some service against the Indians. He entered the Confederate army, commanded a brigade, and was severely wounded at Gaines's Mill, at Gettysburg, and at Chickamauga, where he lost a leg and was made lieutenant-general. He commanded a corps under General J. E. Johnston in the retreat to Atlanta, and in July 1864 succeeded him in command of the army. On September 1 he was compelled to evacuate the city, and leave the road free for Sherman's march to the sea. He yet made a bold attempt to cut Sherman's communications, and, though worsted at Franklin on November 30, pushed as far north as Nashville; but here he was again defeated by Thomas on December 16, and at his own request he was relieved of command. He died in New Orleans, 30th August, 1879. His personal experiences were published posthumously as *Advance and Retreat* (1880).

HOOK, JAMES CLARKE, an English painter, was born in 1819. He commenced his artistic career by painting pictures based on Scriptural and poetical subjects. Afterwards he produced many excellent paintings, whose subjects were pastoral or modern. In 1860 he was elected a Royal Academician. Consequently upon the success of his well known *Luff, Boy!* Mr. Hook has more recently devoted his talents to marine pictures, and is a regular contributor to the Royal Academy. Three paintings by Mr. Hook attracted much admiration at the academy in 1890.

HOOKAH (from Arabic *huqqa*, through the Hindustani; the Persian *kalyun*; also called Nargileh, from Persian *nārgil*), the water tobacco-pipe of Arabs, Turks, Persians, Hindus, and other Orientals. It consists of a bowl for the tobacco, a water-bottle, and a long flexible tube ending in the mouthpiece. A wooden tube leads from the bottom of the head or bowl down into the water in the bottle, and the flexible tube is continued down-

wards by a stiff tube into the space above the water in the bottle. Thus the smoke is cooled before it reaches the mouth of the smoker. Many of these pipes are beautifully decorated, or even encrusted with gems. The *hubble-bubble* of India (named from the sound produced) is a similar but simpler water-pipe, made of a cocoanut filled with water, and two short wooden tubes at right angles, one going into the water, the other merely passing inside the top of the shell.

HOOKER, CHARLES E., a United States Congressman, born in South Carolina. After he was admitted to the bar he removed to Mississippi. In 1850 he was elected district attorney of River district, and to the legislature in 1859. In 1865 he was made attorney-general of the State, and reelected in 1868. He was elected to the 44th, 45th, 46th, 47th, 50th, 51st, 52d and 53rd Congresses as a Democrat.

HOOKER, SIR JOSEPH DALTON, a son of Sir W. J. Hooker (1785-1865), was born at Halesworth, in Suffolk, June 30, 1817, and was educated at the High School and University of Glasgow, graduating M.D. in 1839. He soon afterward joined the antarctic expedition of the *Erebus and Terror* . Returning after four years' absence, he acted for some time as substitute for Professor Graham in the chair of botany at Edinburgh University; in 1846 was appointed botanist to the geological survey of Great Britain, and in the following year undertook a botanical expedition to the Himalayas, which occupied him for three years. In 1871 he made an expedition to Morocco, ascending the great Atlas, the summit of which had never before been reached by a European. In 1877 he accompanied Doctor Asa Gray in a scientific tour through Colorado, Utah and California.

During this visit he was most cordially received by the leading scientific men of America. On his return he presented to Kew a large collection of seeds and museum specimens, and a herbarium of about a thousand species, together with notes on the distribution of North American trees in particular. In 1854 he was awarded a gold medal by the Royal Society. In 1884 the founders' medal of the Royal Geographical Society was awarded to Sir Joseph Hooker "for his eminent services in scientific geography," and in 1883 the Society of Arts presented to him their Albert medal for the services he has rendered to the arts, manufactures and commerce by promoting an accurate knowledge of the flora and economic vegetable products of the several colonies and dependencies of the empire.

Sir Joseph Hooker has published a number of valuable works, of which one of the best known is *Students' Flora of the British Islands*, and the most important, the *Genera Plantarum* in conjunction with George Bentham (3 vols. 1862-83). He has been a president of the Royal Society.

HOOKER, THOMAS, one of the founders of Connecticut, was born at Markfield, Leicestershire, in 1586, studied at Cambridge, and became a Fellow of Emmanuel College, and was for four years a curate at Chelmsford. Ejected for nonconformity, he lived in Holland until 1633, when he went to Massachusetts, and received a charge at Cambridge. In 1636 he removed with his congregation to Connecticut, and founded the town of Hartford, where he died, July 7, 1647.

HOOKER, WORTHINGTON (1806-67), an American physician. In 1829 he began the practice of medicine in Norwich, Mass., and from 1852 to his death was professor of the theory and practice of medicine in Yale.

HOOKS AND EYES. These dress fasteners were formerly made by hand, but for many years they have been made by machine. By one kind of

machine the wire is first drawn off a reel, next cut to the required length; then by a sinker forced into a slot, by which it is bent, and at the same time the two ends are formed by cams into the lateral loops. A hook requires an additional bend, and this is produced by another slot and sinker.

HOOK-SQUID, one of the cephalopod mollusks of the family *Onychoteuthidæ*, remarkable for its long hooked tentacles and suckers, which are employed to seize its prey. It sometimes attains a length of six feet, and is much dreaded on account of its voracious habits. It ranges through most seas.

HOOPSTON, a village of Vermilion county, Ill., situated at the junction of the Chicago, Danville & Vincennes Railroad, with the Bloomington division of the Wabash Railroad, 104 miles south of Chicago. It has elevators and considerable traffic in grain.

HOOSAC RIVER rises in Lanesboro, Berkshire county, Mass.; flows north, crosses a corner of Vermont northwest into New York, entering the Hudson about 14 miles above Troy. It affords considerable water-power, and in New York is called Hoosick River.

HOOSICK FALLS, a village of Rensselaer county, N. Y., 26 miles northeast of Troy. It has manufactories of lumber and mowing machines, and contains malleable iron works. Pop. 7,014.

HOPE, a post-village and railroad junction of Hempstead county, Ark., situated 112 miles from Little Rock, and 33 miles from Texarkana, on the St. Louis, Iron Mountain & Southern Railroad.

HOPE-SCOTT, JAMES, third son of the Honorable Sir Alexander Hope, and grandson of the second Earl of Hopetoun, born at Marlow in 1812, died in London, April 29, 1873. He was educated at Eton and at Christ Church, Oxford, and, admitted to the bar in 1838, soon made a great parliamentary practice. His life, by Robert Ormsby (2 vols., 1884), is specially interesting for the glimpses it gives of men greater than himself, as Cardinal Newman and Mr. Gladstone.

HOP-FLEA, or **TOOTH-LEGGED BEETLE** (*Phyllotreta*, or *Haltica confinna*), a very small coleopterous insect, which often in the spring devours the tender tops of young shoots in hop plantations. It is of the same genus as the turnip-fly (*Phyllotreta nemorum*).

HOP-FLY (*Aphis*, or *Phorodon humuli*), a species of aphid, or plant-louse, important on account of the injury it inflicts on the hop plantations. The general color is pale-green. Both larvæ and adults ruin the plants. No efficient method of preventing the ravages of this pest has yet been discovered; but the beneficial service to man of lady-birds and other natural foes of this fly has been long and widely recognized.

HOPKINS, ALBERT J., a United States Congressman, born in 1834. He was admitted to the Illinois bar, and began practice in Aurora, Ill. From 1872 to 1876 he was State's attorney of Kane county, and from 1878 to 1880 was a member of the Republican State central committee. He was elected as a Republican to the 49th, 50th, 51st, 52d and 53d Congresses.

HOPKINS, EDWARD (1600-57), an English statesman. He emigrated to Boston, Mass., in 1637, and shortly afterward removed to Hartford. From 1640 to 1664 he was governor of the colony every even year, alternating with John Hayes. He then returned to England and became warden of the fleet, commissioner of the admiralty, and member of parliament. At his death he left \$3,500 to educational institutions in New England.

HOPKINS, ESEK (1718-1802), an American naval officer. In 1775 he was commissioned by the Continental Congress commander-in-chief of the navy,

and in February of the following year, put to sea with the first squadron sent out by the colonies. He was officially complimented for his success in several engagements, but in 1777 was dismissed from the service for neglecting a citation to appear in Philadelphia. Subsequently he settled in Rhode Island, and several times was chosen a member of the general assembly.

HOPKINS, JOHN HENRY (1792-1868), an American P. E. bishop. In 1818 he was admitted to the Pennsylvania bar, and gained an immense practice, but five years later became a priest in the Protestant Episcopal church. In 1832 he was made bishop of Vermont. He was the author of numerous works on theological and social issues, his latest essay, *The Pope Not the Antichrist*, being published in 1868.

HOPKINS, JOHNS, philanthropist, and famous for his princely gifts for educational purposes, was born in Anne Arundel county, Md., in 1795, of Quaker parents. He acquired a gigantic fortune in business pursuits and determined to devote a large portion of it to philanthropic uses during his lifetime. In 1873 he founded a hospital in Baltimore with princely endowments, devoting in all \$4,500,000 to that institution, which by the terms of its establishment was made free to all, independent of race or color. By will he gave \$3,500,000 to found the Johns Hopkins University, one of the most complete educational institutions in the country. Mr. Hopkins died in Baltimore, Dec. 24, 1873.

HOPKINS, MARK (1802-87), an American educator. In 1830 he accepted the professorship of moral philosophy and rhetoric at Williams College, and from 1836 till he resigned in 1872 was president of the college. He retained the pastorate of the college church until 1883.

HOPKINS, STEPHEN (1707-85), a signer of the Declaration of Independence. He was a statesman of high rank, and held numerous important public offices. For many years he was a member of the Rhode Island assembly; was justice of the peace, and judge of the court of common pleas; was governor of the colony, and was a member of several congresses. He wrote *History of the Planting and Growth of Providence* (1765).

HOPKINSON, JOSEPH (1770-1842), an American jurist. In 1791 he was admitted to the Pennsylvania bar, and in 1814 was elected a representative to Congress. In 1828 he was appointed United States Judge for the eastern district of Pennsylvania. Mr. Hopkinson was the author of the national song, *Hail, Columbia*.

HOPKINSVILLE, a city and county-seat of Christian county, Ky., situated 71 miles northwest of Nashville, Tenn. The locality is very fertile, and produces tobacco, coal and iron. The city contains South Kentucky College, two seminaries, a State insane asylum, and manufactories of carriages and plows. Pop. (1890), 5,833.

HOPLEGNATHIDÆ, a family of acanthopterous fishes, limited, so far as known, to the single genus *Hoplegnathus*. It is characterized by having a continuous lateral line, perfect ventral fins, and intermaxillary and maxillary bones provided with a trenchant edge, with which the teeth are continuous. Several species are known as inhabitants of the Pacific Ocean.

HOPPIN, JAMES MASON, an American educator, born 1820. In 1842 he graduated at Harvard Law School, and in 1845 from Andover Theological Seminary. From 1850 to 1859 he was pastor of the Congregational church at Salem, Mass., and two years later became professor of homiletics in Yale. He was the author of a great number of theological works.

HORE, ANNIE BOYLE, wife of Edward Coode Hore, was born in Bloomsbury, London, April 8, 1853. In 1882 she commenced her travels in Central Africa, her first journey being from Saadani to Mambria, 200 miles inland. In 1884 she attempted to reach Tanganyika by the Nyasso route but was compelled to return, owing to the war between the Portuguese and the natives. A month later she joined her husband at Delagoa Bay, and together they reached lake Tanganyika via Ujiji and Unyamwezi. She was the first white woman to reach Tanganyika. She spent four years on Kavala Island, teaching children the rudiments of Christianity and civilization. Mrs. Hore has written an entertaining book of travels *To Lake Tanganyika in a Bath Chair*.

Captain Hore is the author of *A Boat Journey Across Africa* and *A Ray of Light in the Dark Continent*.

HORODENKA, a town of Austria, in East Galicia, a hundred and six miles southeast of Lemberg. Population, 10,226.

HOROLOGY, the science which treats of the construction of apparatus for measuring and telling the time. On the construction of ordinary clocks, see *Clocks*, in *Britannica*, Vol. VI, pp. 13-35; and on the construction of ordinary watches see *Watch*, in *Britannica*, Vol. XXIV, pp. 394-98. The improvements in the escapement and the pendulum of the clock bring the mechanical perfection of this time keeping instrument to the point which it has attained at the present day. But the



HORE, EDWARD COODE, an English seaman and traveller, was born in Islington on July 23, 1848. He was of Cornish parentage. He was apprenticed, at the age of sixteen, to the owner of a London ship and visited nearly every part of the world. He rose to the rank of captain. In March, 1877, Captain Hore was appointed to the London Missionary Society's pioneer expedition in Central Africa. He lived on the shores of Lake Tanganyika for about ten years, surveyed its coast line in a little log canoe and discovered the Lukuga to be the true outlet of the lake. He returned to England in 1882 to report upon his work. In 1882 he took the sections of a steel lifeboat, on trucks, from Saadani to Ujiji, a distance of 836 miles, in less than 100 days. In 1888 he finished the building of the steam yacht, "The Good News," on Lake Tanganyika. Captain Hore received a gold chronometer from the Government of the French Republic for attention and assistance to the late Abbé Debaize; and, in 1890, received the Cuthbert Peek grant from the Royal Geographical Society.

art of horology would be incomplete unless there were some standard, independent of individual mechanical contrivances, by which the errors of each may be daily corrected. This standard is supplied by observatories. The big Naval Observatory at Washington determines, and gives away to any one who chooses to ask for it, absolutely correct time at noon each day. Experts paid by Uncle Sam make the computation and press a button at precisely 12 o'clock, thus communicating the hour to the various departments in the city. The Western Union Telegraph company is permitted to have its instruments in the room whence the message is sent, with an attachment to the button, so that the news is flashed directly from the observatory, without even the aid of an operator, all over the United States, reaching even so distant a point as San Francisco within the space of not more than one-fifth of a second—for such is the time usually required for the passage of an electric spark through 3,000 miles of wire. To accomplish this the telegraph company is obliged to take all

other business off the wires, each day just before 12 o'clock. Three minutes and a half before noon arrives, operators in all parts of the country cease sending or receiving messages and devote their attention to attaching wires in such a manner as to establish unbroken connections from Washington with points in every section of the Union to which the lines extend their ramifications. A dozen seconds before the time-bell is to strike, a few warning ticks come flashing along, and at the very moment when the sun passes over the seventy-fifth meridian a current gives a single throb from Maine to Florida, and from the Atlantic to the Pacific, informing an expectant nation of the time of day. The noon signals sent out from Washington serve to indicate 11 A. M. for Chicago, 10 A. M. for Omaha, and 9 A. M. for San Francisco. In this manner the Western Union Telegraph Company keeps corrected by electricity to absolute solar-time not less than 7,000 clocks in the city of New York alone, and in all the United States perhaps as many as 70,000. As each clock is charged \$15 a year for this service, the company derives an income of about one million of dollars from this source. The clocks that are set every noon in a thousand cities and towns by a single pressure of a button in Washington are equipped with a peculiar electrical contrivance by means of which the galvanic current passing through it springs the hands of each time-piece simultaneously to the point of 12, if in the eastern time-belt; to the point of 11, if in the central time-belt; to the point of 10, if in the mountain section; and to the point of 9, if in the Pacific section. The United States Government avails itself gladly of this chance to extend the courtesies of the hour to 63 millions of people, especially in all important seaport towns, where the noon time balls are dropped in order that the mariners may be able to correct their chronometers. This last was from the start the prime object of the entire service. The Naval Observatory does not reckon its time by the sun, but by the fixed stars, which are so far off that their position with relation to the earth does not change appreciably within a few months or even years. Star-time is therefore, the only true time. The operator looks through his large telescope and watches for a given star which he knows to cross the plane of the 75th meridian west of Greenwich. Its time was adopted for the District of Columbia by act of Congress, approved March 13, 1884. The observer has a star-time clock and a printed table that shows him at what second the star in question must actually have crossed the meridian. He corrects the observed time, if necessary, by the table, which is always correct, and reduces it to sun-time. Since the star-year is one day longer than the sun-year, the reduction of the star-time to sun-time requires considerable figuring. A sun-time or "standard" clock stands close by, and by the amount that this varies from the calculated or true sun-time, the clock indications are at once changed. The noon-stroke is sent all over the country according to this corrected sun-time. At the observatory all the chronometers made for the navy are tested and regulated before they are sent out on vessels. It takes 21 weeks of testing to properly regulate and prove one of them. A part of the trial consists in subjecting the instrument to the action of cold in an ice-box, and again to heat as communicated through steam-pipes. Each chronometer, when given out to the navy, is accompanied by a chart telling just how much it will vary under certain temperatures.

THE NEW STANDARD OF TIME IN THE UNITED STATES is established in the following way: The

country is divided into four "time-belts," based on the 75th, 90th, 105th and 120th degrees of longitude. This makes just an hour's difference in clock-time between any two nearest ones of the four meridians mentioned. On each side of these lines the same clock-time extends for about $7\frac{1}{2}$ degrees longitude. This plan went into effect Nov. 18, 1883. The change to this new standard caused but unimportant differences anywhere, save in places where two belts meet. Thus, in Pittsburgh, Pa., a passenger coming into the city on a train from the east and going directly west, should his train leave immediately, will find that there is just one hour's difference in clock-time or train-time between the moment of his arrival and that of his departure; while in fact there is not a minute's difference of real time. His watch will be an hour ahead of the time used on his departing train. On going east his watch will be an hour behind, as an hour can be more easily reckoned than an uneven number of minutes.

This plan of dividing the country into belts about 15° wide is more practicable than it would be to divide it into narrower belts. Besides, a passenger from Portland, Me., to Charleston, S. C., for instance, or from Chicago to New Orleans can make the entire run without changing his watch. This division into hour-belts has been adopted by all important cities, and by the railroads throughout the United States.

1. The following cities have noon at the same moment: Albany, N. Y.; Augusta, Me.; Baltimore, Md.; Bangor, Me.; Boston, Mass.; Brooklyn, N. Y.; Buffalo, N. Y.; Burlington, Vt.; Charleston, S. C.; Cleveland, O.; Concord, N. H.; Hartford, Conn.; New Haven, Conn.; New York, N. Y.; Philadelphia, Pa.; Pittsburgh, Pa.; Portland, Me.; Providence, R. I.; Richmond, Va.; Savannah, Ga.; Washington, D. C.; Wilmington, N. C.

2. When the cities mentioned under 1 have noon, the following have 11 o'clock, A. M.: Atlanta, Ga.; Chicago, Ill.; Cincinnati, O.; Columbus, O.; Detroit, Mich.; Dubuque, Iowa; Galveston, Texas; Hannibal, Mo.; Indianapolis, Ind.; Kansas City, Mo.; Little Rock, Ark.; Louisville, Ky.; Memphis, Tenn.; Milwaukee, Wis.; Minneapolis, Minn.; Mobile, Ala.; Nashville, Tenn.; New Orleans, La.; Omaha, Neb.; Pensacola, Fla.; Quincy, Ill.; St. Joseph, Mo.; St. Louis, Mo.; St. Paul, Minn.; Terre Haute, Ind.; Vicksburg, Miss.

3. When the cities mentioned under 1 have noon, the following places have 10 o'clock, A. M.: Denver, Col.; Salt Lake City; Utah City, Utah; Santa Fé, New Mexico; and

4. The following cities have 9 A. M.: Boise City, Idaho; Portland, Oreg.; San Diego, Cal.; San Francisco, Cal.; Seattle, Wash.; Virginia City, Nev.

The boundary lines of the time-belts coincide with the lines of the meridians only in a very general way. In the accompanying map the three heavy and irregular north and south lines are these dividing lines. The one dividing the eastern and central belts passes through Detroit, Mich., Buffalo, N. Y., Pittsburgh, Pa.; through the western portions of Virginia, West Virginia and North Carolina to the city of Atlanta, Ga., and thence eastward to Charleston, S. C. The boundary line between the central and mountain belts runs nearly due southward through Bismarck in North Dakota to Dodge City in Kansas; and thence south-westward to El Paso, Texas. And the dividing line between the mountain and Pacific belts runs along the boundary line between the States of Montana and Idaho, thence due south to Ogden, Utah; and thence to Yuma, Arizona, at the head of the Gulf of California.

HORNBY, SIR GEOFFREY THOMAS PHIPPS, an English naval officer, was born in 1825, entered the navy in 1837 and was present as a midshipman at the bombardment of Acre. He commanded the first flying squadron as captain, taking it around the world. He succeeded Admiral Wellesley as rear-admiral, attaining flag rank in 1869. He was commander in chief of the naval forces in the Mediterranean in 1878, when war was imminent between England and Russia. He was a lord of the admiralty under Lord Beaconsfield's administration. He was appointed president of the Royal Naval College, at Greenwich, for a term of three years. He was created a knight commander of the Bath. He is at present retired from active service.

HORNBY, JAMES JOHN, D.D., was born in England in 1826, and educated at Eton, and at Balliol College, Oxford, where, in 1849, he took a first-class in classics. In 1849 he became a fellow of Brasenose College, and in 1854 tutor and principal of Bishop

Cosen's Hall in the University of Durham. Returning to Oxford in 1864, he became classical lecturer at Brasenose, and in 1866 was senior proctor of the university. At the close of the latter year he was elected second master of Winchester School, which post he retained till his appointment as head master of Eton in January, 1868. Doctor Hornby was appointed one of her majesty's honorary chaplains in February, 1882, and made D.C.L. of Durham University the same year. He was appointed to the provostship of Eton, July, 1884.

HORSE (*Equus*), an ungulate or hoofed mammal of the order Perissodactyla, characterized by having an odd number of toes; the family Equidae formed the group Solidungula of old writers, owing to the presence of only a single hoof, which marks them off quite sharply from all allied animals. The English name is found in Anglo-Saxon as *hors*, and is cognate with the Icelandic *hross*, German *ross*; it is sometimes referred to Sanskrit root *hresh*, "to neigh," but, according to some, with more probability, to a Teutonic root *har*, "to run," cognate with Latin *currere*. The Latin name is no doubt from the root *ak*, conveying the idea of swiftness; Sanskrit *akva*; Gr. *hippos* or *hikkos*; Lat. *equus*.

The explorations of the Russian traveler, Przhevalski (Prejevalsky), in 1881, added another species to the list of Asiatic forms, which has been called after him. The long hairs of the tail begin only half-way down it; the mane is short and erect, and there is no forelock; the head is large and heavy; the ears smaller than those of the ass. It inhabits the dry sultry regions of the Dzungarian Desert, living in companies of fifteen to twenty, each led by a stallion. Only two herds were observed, and only one specimen was secured. The resemblance which this species presents to the horse of early sculptures has been pointed out by several observers.

The senses of the horse are acute, though many animals excel it in this respect; but its faculties of observation and memory are both very highly developed. A place once visited or a road once traversed seems never to be forgotten, and many are the cases in which men have owed life and safety to these faculties in their beasts of burden. Even when untrained it is very intelligent; horses left out in winter will scrape away the snow to get at the vegetation beneath it, which cattle are never observed to do. Perhaps this may be inherited from their ancestors in the Siberian plains; but curiously enough the very same habit is observed in the horses of the Falkland Islands, whose ancestors in La Plata could have had no occasion to show the same instinct for many generations back.

With patience and kind treatment the horse can be trained to go through quite complicated feats of memory and perception. That it possesses also an accurate sense of time is clear from the facility with which it can be taught to walk, trot, and dance to music, or take part in concerted evolutions. Its knowledge of tunes is evinced by its comprehension of military signals. It is very timid and cautious and suspicious of every new sight or sound; while in respect to moral qualities it is scarcely too much to say that horses are as diverse as men.

The history of the horse can be traced back, though with extensive gaps, to the beginning of the Tertiary geological period, where we find the remains of a small ungulate no larger than a fox, to which the appropriate name *Eohippus* has been given. It was of very generalized structure, having for example four complete toes and a rudimentary fifth on the fore-feet. In Miocene times it was

succeeded by *Miohippus* and *Anchitherium*, which in their turn gave place to the Pliocene *Hipparion* and *Pliohippus*, each of these showing an increase in size and a closer approach in structure to the modern horses. The history of the feet in particular furnishes one of the best examples we know of the gradual evolution of a specialized from a more generalized organ. The skull and neck became coincidentally more elongated, and the teeth underwent changes which have been already alluded to.

The etymological synopsis above given shows that the horse was known to the Aryan people before their dispersal. Incised figures of the horse upon bones have been found in cave-deposits referred to the Palaeolithic age, and there is evidence to show that at this period the animal was an object of the chase and a source of food. It was probably small and heavy, with a large head and an upright or hog-mane; and attention has been already called to the resemblance which some of the sculptured figures of antiquity bear to the *Equus przewalskii* above described.

The horse reappears in Neolithic remains in the Swiss lake-dwellings and elsewhere, but here apparently still as an object of the chase. The precise date of its domestication is uncertain. On Egyptian monuments no trace of it appears before the expulsion of the Hyksos or shepherd kings; and it is generally stated that the animal was previously unknown to the Egyptians, though it can hardly be considered as proved that it was introduced by the Hyksos.

In Scripture the horse is only referred to in connection with warfare; witness the poetic description of the war horse in the Book of Job. The earliest mention of the animal in Holy Writ occurs in connection with the famine in Egypt, when Joseph gave the people corn in exchange for their horses; and its use for riding is alluded to in 2 Kings, xviii, 23.

In Homeric times the horse was not used for riding; indeed, at the battle of Marathon (490 B. C.) the Persians, but not the Greeks, used cavalry. After 450 B. C., however, the art was practised in Greece, and a treatise upon it, of somewhat later date, from the pen of Xenophon, still exists. The war horses of the Britons and the chariots, their wheels armed with scythes, are described by Cæsar. Athelstan paid special attention to the breed of English horses, and even imported animals from Spain for its improvement. In this he was followed by other monarchs, as John and Edward III. In the reign of this latter king a law was passed forbidding the exportation of horses, and a number of Spanish jennets were introduced. Henry VIII. made various enactments for improving the condition of the English horse, particularly relating to the pasturing of entire horses upon commons and open lands, where a good deal of promiscuous and detrimental breeding had taken place. In the reign of Elizabeth it was penal to make over a horse "to the use of any Scottishman," a prohibition naturally repealed by her successor, who further signaled himself by bringing over to England the "Markham Arabian," believed to have been the first of that breed introduced. He did not prove a success; but still the experiment was repeated from time to time, and in William III.'s reign the "Byerly Turk," the first of a celebrated trio, was brought over to England. At the very beginning of the 18th century came the "Darley Arabian" (the sire of Flying Childers, 1715), and later the "Godolphin Arabian," or Barb (1724-53). The first of these was the great-grandfather of the celebrated racer "Eclipse" (foaled

1764), from whom so many winners of important races have descended. Indeed, it is not too much to say that from one or other of these horses, in most cases from all three, all horses at present on the turf trace their descent in the male line. Since the commencement of the 19th century an accurate record has been kept of the descent of all race-horses, and an attempt has been made to carry the history about a century further back.

There has been much discussion and speculation as to the kind of animal from which the domestic horse has been derived. Colonel Hamilton Smith supposed that the modern breeds have descended from about five primitive differently-colored stocks, but this view finds no supporters nowadays; rather it is maintained that "the similarity in the most distinct breeds in their general range of color, in their dappling, and in the occasional appearance, especially in duns, of leg stripes and of double and triple shoulder-stripes, taken together, indicate the probability of the descent of all the existing races from a single, dun-colored, more or less striped primitive stock, to which our horses still occasionally revert."

Whether the actual species thus alluded to is still living in the wild state is extremely uncertain; indeed it is held by many competent judges that no primitively wild horses now exist, the herds of horses that roam over the Russian steppes being supposed to be the descendants of animals which were once domesticated, and have relapsed into the feral state, as is known to be the case with the mustangs of South America.

The Tarpan, or wild horse of southern Russia, is a small animal, with thin, but strong, long-jointed legs, longish thin neck, and comparatively thick head, pointed ears directed forwards, and small vicious eyes. The coat in summer is close, short, and wavy, especially behind; in winter it is thick and long, forming a kind of beard under the chin; the mane thick and bushy, the tail of moderate length; the color generally pale brown or yellowish in summer, almost white in winter. It is found in southern Russia, but (according to Radde) is absent from Central Asia, even from the north of the Gobi, where the dziggetai is found. It lives in large herds, often numbering several hundreds, subdivided into little groups or families, each presided over by a stallion, who protects his retinue valiantly, but permits no irregularities in their behavior; young horses keep at a distance on the outskirts of the herd until they are able to undertake the cares of a family for themselves. The stallions are ever on the alert with nose and ear to detect the approach of danger, of which they give notice by a loud neigh, upon hearing which the whole herd takes to flight, sometimes disappearing as if by magic from the crafty manner in which they take advantage of irregularities in the ground. The story that they protect themselves by forming a ring with heads directed inwards has no foundation in fact, although the stallions will defend the mares and foals from impending attack. The stallions fight vigorously among themselves with teeth and hoofs, and each as he attains maturity must win his position in the herd by a series of duels. They present all the appearance of truly wild animals, and are regarded as such by the Tartars and Cossacks, who destroy them on all possible opportunities, because they are useless for taming purposes, and because they inflict considerable damage upon these horse-rearing communities by devouring their stores of hay and enticing away their mares.

The South American wild horses, known as "cimarrones" or "mustangs," are reported by Azara to

be the descendants of some half-dozen individuals which were left to their own resources when the town of Buenos Ayres was abandoned about 1535. When in 1580 the town was reinstated, they were found to have increased to a very considerable number. They are of the same size as the domestic horses, but with thicker heads and legs, and longer necks and ears; all are brownish or blackish in color. Their social system is the same as that of the Tarpans. They proceed in Indian file, leaving no gaps in the series, and are avoided by travelers, owing to their attempts to entice tame horses into their company, not unfrequently with success. The Indians on the pampas eat the mares and foals, and also capture a certain number in order to tame them; but the Europeans make no use of them, except perhaps to kill one when fuel is scarce in order to replenish the camp-fire with its marrow. The accounts given by travelers of these animals differ in many important particulars.

The subject of the horse's paces is one which has given rise to much controversy. It has been maintained that horses in a wild state use only the walk and gallop, the trot and others being the results of education. This question can hardly be regarded as settled even now, for the fact that quite young foals have been observed to trot beside their dams is explicable as an instance of heredity.

Six well-marked paces may be distinguished in the movements of domesticated horses—the walk, the amble, the rack or pace, the trot, the canter, and the gallop. The study of the precise movements of the different limbs in carrying out these paces is very difficult, especially in the case of those in which the motion is rapid. Marey, the French physiologist, was the first to attempt a rigorous analysis of these movements by means of apparatus.

He attached to the horses' hoofs small elastic bags, connected by tubes with pointers, which made marks upon a revolving cylinder. When any one of the feet touched the ground the bag was compressed, and the pointer instantly made a corresponding mark upon the cylinder. Very valuable results were obtained by this method of study; but they need not be further detailed here, as they have been superseded by the beautiful photographic investigations of Muybridge. In these experiments the horse was made to proceed along a track in front of a row of twelve or twenty-four cameras, so arranged that, as the animal passed in succession before each of them, an instantaneous photograph of it was obtained. These pictures furnish the means of analyzing the various paces, as the exact attitude of the horse is shown at very short intervals of time. In the case of an ordinary walk the horse has always two and sometimes three feet on the ground at once. The order of the succession of the footfalls is as follows: left hind, left fore, right hind, right fore; furthermore the horse is alternately supported by the two feet of the same side (laterals) and by a hind and a fore foot of different sides (diagonals); when the animal rests upon the laterals, the suspended feet appear in a side view between the supporting feet; when upon the diagonals, the suspended feet hang out one in front of and the other behind the supporting feet. These rules furnish the means of testing the accuracy of artistic representations of walking horses. The amble is a rapid walk, the length of time the feet rest upon the ground being reduced so that the body is often supported upon only one foot, and generally only on two. The rack, or, as it is called in America, the "pace," is a step but rarely seen; in it the laterals move synchronously with each other, so that a horse performing this action has been aptly compared to two men running one behind the

other and keeping step. The trot has been defined as a pace characterised by the synchronous movement of the diagonal limbs, though in practice the movement is rarely, if ever, quite simultaneous. It has often been maintained by experienced horsemen that a horse in trotting has always at least one foot in contact with the ground. So far, however, is this from being the case, that a fast trotter is quite unsupported for more than half the distance he traverses in each stride. In the canter the order of the footfalls is the same as in the case of the walk, and the characteristic difference is due to the peculiar rhythm as well as to the final effort which propels the body at the conclusion of the stride as the fore-leg leaves the ground.

Recently much attention has been paid in America to the trotting horse, the track and the sulky. The kite-shaped track and the light sulky with pneumatic tire have added much to the reduction of trotting time. The best time made up to Dec. 31, 1892, was a mile in 2:04 by Nancy Hanks. It is expected soon to reach two minutes, a time once deemed impossible. See *Britannica*, Vol. XII, p. 172.

HORSEHEADS, a town of Chemung county, N. Y. It contains a woolen mill, saw mill, and a very large brick-yard. Population (1890), 1,716.

HORSE ISLAND, an island in Lake Ontario, and in Jefferson county, N. Y., two miles from Sackett's Harbor. It has a light-house. Area, 27 acres.

HORSE-POWER. The word *power* is of frequent use as a scientific expression. Thus we speak of steam-power, water-power, and so on. When used in this sense it is quite obvious that reference is merely made to the nature of the store of energy in the particular motor under consideration. Again, when we speak of the total energy of a given system as the total power that it has of doing work, it would seem to be almost an insult to the mental power of our auditor to tell him in addition that by the latter phrase we mean simply total work measured in terms of any convenient unit. But it is often necessary to know the quantity of work which can be produced in a given time by a given motor. It is in this connection that the term *horse-power* is used to denote the rate at which, on the average, a horse can do work per unit time, and this rate is adopted in Britain as the unit rate of working. Estimates of its numerical value necessarily differ very much; and so, in order to get a definite unit available for scientific purposes, the convention is made that the original estimate of Boulton and Watt shall be regarded as correct. The value which they gave was 33,000 foot-pounds per minute.

An ordinary rule for calculating the horse-power of a steam-engine is to divide by 33,000 the continued product of the area of the piston in inches, the pressure in pounds weight per square inch, the length of the stroke in feet and the number of strokes per minute. Thus, by the horse-power of an engine we merely mean the numerical rate at which it can do work, expressed in terms of the above conventional unit, and this number obviously coincides with the number of horses to which the engine is equivalent as regards work in the same time. Owing to friction the available horse-power is less than the actual horse-power got by this rule.

HORSFORD, EBEN NORTON, born in Livingston county, N. Y., July 27, 1818; studied engineering and was engaged on the geological survey of the State of New York. In 1840 he was appointed professor of mathematics in the female academy at Albany, where he remained for four years. He afterward studied in Germany, under Liebig, and on his return to the United States in 1847, was

elected Rumford professor of science at Harvard. After sixteen years' service there he resigned to engage in chemical experiments. He is an A. M. of Harvard and M. D. of Castleton, Vt., and has written extensively on scientific subjects.

HORSLEY, JOHN CALLCOTT, R. A., son of the late William Horsley, the well-known musician, was born in London, January 29, 1817. His first exhibited picture, painted while he was a youth—*Rent Day at Haddon Hall in the Sixteenth Century*—was spoken of in high terms by Wilkie. *The Chess Players*, *The Rival Musicians*, *Waiting for an Answer*, were first seen in the British Institution, and he exhibited, for the first time at the Academy, the *Pride of the Village* (in the Vernon Gallery). This was followed by *The Contrast: Youth and Age*, in 1840; *Leaving the Ball*, another *Contrast*—gay pleasure-seekers on the one hand, the homeless outcast on the other; and *The Pedlar*, both in 1841; *Winning Gloves*, in 1842; and *The Father's Grave* in 1843. In the latter year Mr. Horsley's cartoon of *St. Augustine Preaching* gained, at Westminster Hall, one of the three prizes in the second rank. He was among the six painters commissioned to execute frescoes for the palace at Westminster. That of 1845, for *Religion*, was approved, and the subject executed at large in the House of Lords. In 1847 his colossal oil painting, *Henry V., believing the King dead, assumes the Crown*, secured a premium. In 1882 Mr. Horsley was elected treasurer of the Royal Academy. He has been very active in bringing together the magnificent collections of "Old Masters" displayed every winter since 1870 at Burlington House.

HORSE-RADISH TREE, the *Moringa Pterygo-sperma*, a tree common in India and Arabia, and cultivated in various other tropical countries. The fruit is eaten as a vegetable or pickled, and its seeds are important as furnishing the commercial oil of ben. The fresh root has an odor and taste resembling that of the horse-radish.

HORSE-SHOEING. **FARRIER**, A horse used for drawing burdens heavier than his own weight upon hard roads or for fast riding, requires to be shod from time to time. If left unshod his hoofs break and wear away more rapidly than they are renewed by the addition of horny material from within, and become tender and sore. This is avoided by properly paring the hoofs and nailing on iron plates, or iron bands, called *horseshoes*.

The hoof of the horse consists of three portions, which are so closely united as to seem but one. These are the wall or crust, the sole, and the frog.



The wall is all that part of the hoof that is visible below the hair when the foot is placed upon the ground. It is in the form of a cylinder cut across obliquely at the top. It is deepest in front, from three to four inches, and grows gradually less in depth toward its posterior aspect. This wall is in front about half an inch in thickness, becoming thinner on the back side as it extends around the foot. It has an edge bearing upon the ground of about half an inch around the outside of the bottom of the foot. Upon the inner side of the foot the wall is thinner than upon the outside.

The illustration will show the relative parts: Ground surface of hoof, *a*, toe; *a* 1, inner toe; *a* 2, outer toe; *b* 1, inner quarter; *b* 2, outer quarter; *c* 1, inner heel; *c* 2, outer heel; *d*, *d*, *d*, sole; *e*, *e*, wall of the hoof; *f*, *f*, the bars; *g*, *g*, the commissures; *h*, *h*, *h*, the frog; *h*, part under the navicular joint; *k*, boundary of the cleft; *i*, *i*, the bulbs of the heels. The wall is divided into toe, quarters, heels and bars.

The toe constitutes about two thirds of the wall, and is sometimes subdivided into toe, inner toe and outer toe. It is the deepest and thickest part of the wall, and stands at an angle of about forty-five degrees. When the angle of inclination is much greater than this the feet are designated as flat and weak. Flat and weak feet usually obtain in large and heavy animals, and it has been thought that as the foot is flattened the anterior wall will be drawn down by the weight, at length becoming fixed.

The quarters are the portions on each side, midway between the toe and the heels, and are designated as the inside and outside quarters. The fibers composing them run obliquely upward and backward, parallel to those of the toe. The quarters slope downward and backward, and become thinner as they approach the heels.

The heels are the two protuberant portions of the wall by which it is terminated posteriorly. The wall here is shortest and thinnest, the fibers being only about an inch in length, and not exceeding the fourth of an inch in thickness. While, in its natural state, there is some degree of elasticity in the entire wall, there is much more in the portion that covers the heels.

The bars are reflections of the wall in toward the center of the foot, on its ground surface. They gradually approach each other, and come together a little in front of the center of the foot. In the natural, healthy foot, that has never been shod, the bars appear as sharpened prominences, like braces, between the center of the foot and the heels. They are well adapted to keep the heel open, and prevent contraction of the hoof. In the unshod foot, the bars have a bearing upon the ground second only to that of the edge of the wall.

The sole fills the space between the wall and the bars. It is in the form of an irregular arched plate, the concavity being toward the ground. It is firmly attached by its outer convex edge, to the inner border of the wall, while its inner straight edges are attached to the bars. Throughout its whole extent the bars intervene between the sole and the frog. The center of the sole is the thinnest portion of it, and it also constitutes the summit of the arch. The lower circumference of the arch, which is also the thickest and strongest, everywhere abuts against the sides of the wall.

The frog is a wedge-like mass filling the angular space between the bars, and consists not of solid horn, as might at first seem, but of a series of elastic arches. It has been not inaptly compared to an elastic keystone received into an elastic arch, communicating in some cases, and admitting in all, the springing movements of which such an arch is capable. The base of the frog lies between and connects the posterior curved portions of the hoof, limiting to some extent their action. The sides are connected with the bars by their upper edges, leaving upon the ground surface two deep channels between the lower border of the bars and frog, which have been termed the commissures of the frog. The horny material arching over these channels is called the arch of the commissures. In the center of the frog as we look upon its ground surface, is a deep, narrow depression, the cleft of the frog, which extends further into the soft tissues of the foot than the commissures. This cleft is arched over in a similar manner, and the cone-like mass, as viewed on its inner upper surface, has received the name of frog-stay or bolt. Looking upon both the exterior and interior surface of the frog, we see that with the bars it forms three elastic foldings, which act as springs to keep the heels apart and the foot well spread. In the natural, unshod foot, the frog though protected to some degree by the inner border of the wall and by the sharp prominences of the bars, must still receive pressure at each step.

The first question in scientific horse-shoeing, "How must the hoof be dressed in order to bring those parts of its inferior surface upon the shoe, which are by nature intended to be the principal weight-bearers?" and the next question is, "How must the shoe be fashioned and applied to the sole?"

A leading French farrier, La Fosse, maintained that the frog, or central prominence of the hoof, is the main weight-bearer, in connection with the wall, and should therefore be placed squarely and firmly upon the ground, but the foremost Italian farrier, Fiaschi, says the frog must not be placed upon the ground on a level with the lower surface of the shoe at the heels, because it is not the primary weight-bearer.

In the feet of colts running freely over upland pastures, the hoofs are marked with quite a downward growth at the heels, a less active growth at the quarters, and a much more rapid downward growth at the toes. The upturned hoofs show plainly that the walls at the heels bend in and land bears the weight at every step. The quarters are elevated, as the hollow of the human foot is arched above the ground. That the entire weight of the horse rests upon the toe-end of the hoof was demonstrated by Dr. Coleman, professor of the Royal Veterinary College, of London, as early as 1799. He removed the bottoms of a horse's front feet-soles, bars, and frogs

—and then walked and trotted him, and even caused him to kick with both hind feet in the air, so that the entire weight of his body was violently concentrated upon the bare front feet, yet the internal structure did not descend to the least perceptible degree.

Subsequent examination of the feet of colts showed also, that their frogs are more spongy and elastic than the front and side walls. And it was also noticed that there is a natural expansion of the hoofs at the heels when the feet press upon the ground, and that a contraction to the normal dimensions follows when the hoof is lifted and freed from pressure. This lateral expansion of the hoofs at the heels every time when a horse's foot is coming down upon the ground breaks the forces of the great concussion produced by a run or gallop of the animal. While the hoofs expand the slightly elevated frogs and soles descend far enough to come in contact with the ground, but with a gentle pressure only.

Previous to these observations the walls of horses' hoofs were often softened with lotions, poultices, or wet swabs. A leather, rubber, felt sponge, or other cushion was sometimes placed between the shoe and the bottom of the foot. This is all wrong except in the case of bruised soles. As the wall in front and at the heels carries the entire weight of the animal it must afford a firm, unyielding support for this weight; whereas the frog is yielding by virtue of its spongy texture, and thus neutralizes the last vestige of concussion produced by a run or gallop. Modern farriers are guided by these observations and considerations. They furnish the only correct data for paring and shoeing both the normal and abnormal hoof.

1. The wall should be perfectly level; that is, both heels must measure the same distance from the ground surface to the coronet, where the hair and hoof unite. Then, at equidistant points, the quarters, the ground surface of the wall, from the heels, the quarters must measure the same height from the ground to the coronet. Then the wall, around the forward arches of the toe, must measure, at corresponding points, the same from the ground surface to the coronet. Then, and only then, will the foot wall be perfectly level, and the action of the foot will be comfortable and correct. For the wall of the hoof land squarely upon even heels, revolve evenly over equal quarters, and spring straight and true from the toes.

2. The hoof must be balanced, that is, the hoof and quarters must be equidistant at corresponding points of the frog. This balancing prevents undue weight on either side, and therefore enables the tendons to carry the hoof straight both in elevating it from the ground and carrying it out straight and true without any interference with the other foot and limb. Moreover, it equally distributes the pressure by equalizing the sections of the foot on either side of the frog.

3. It was found that most foot maladies resulting from horse-shoeing are due to an uneven and unbalanced wall in connection with an undue height of the heels. If the heels are allowed to grow too high, the greater part of the weight is thrown forward upon the bone structure of the limb, and the bones of the foot are forced forward against the wall in front. Inflammation of the feet and soreness in the joints and bones soon ensue. If the heels are allowed to grow such a contrary result. If the heels are allowed to grow too long, then the preponderance of weight is thrown upon the flexor tendons, which are on the back side of the foot, and these tendons become inflamed. The hoofs must therefore be pared in such a way that the weight of the animal is equally distributed between the bones and flexor tendons. If one heel is permitted to grow higher than the other, bruises on the high heel, called corns, with result.

4. Formerly farriers erroneously maintained that the sole should be pared till it yields to the pressure of the thumb. The sole is naturally only from $\frac{1}{4}$ to $\frac{3}{8}$ of an inch thick. It must in all cases, when in a natural condition, be so pared as to approximate the concavity of the hoof, and so that the hoof in its stance should it press upon the shoe, except where the wall is so thin and weak as not to be able to bear the weight of the horse without pain. The frog must only be pared to remove the ragged edges. Some prominent farriers even maintain that the frog should never be touched, alleging that nature sheds the surplusage of horny material at the four seasons.

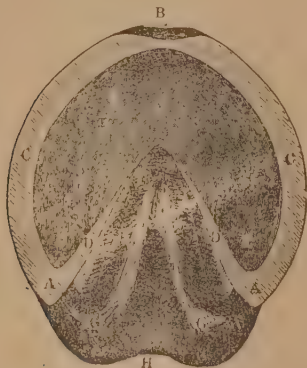
Horses with weak, tender, or bruised soles may for a time require leather or waterproof pads, but as the sole grows these should be discontinued; they are never required in healthy feet where the sole, which is the best and most natural protection, is allowed to grow up to the coronet with a knife. Horses with corns should have their shoes made with a wide inside web, which rests upon the bars, or have for a time a bar shoe. The last nail on the inside should also be dispensed with, and the seat of the corn or bruise carefully pared out, but without injuring either the frog or bars. If, from constant cutting, the bars are unfit to aid in the crust in carrying the shoe, it will be better to turn the shoe off as possible on soft ground, and waiting the healthy growth of the foot. In troublesome cases of thrush such tips are also most serviceable, allowing the frog the natural healthy pressure for which it is intended, and with astringents and cleanliness greatly expediting a cure. Greasy horses should have the toe shortened, and the frog turned up, and the shoes made light and nicely fitted. Overreach, or cutting of the heel of the forefoot with the shoe of the hind, is

remedied by filing round the posterior edge of the offending toe, and keeping that shoe as far back as possible on the foot.

Of the many recent patterns of horseshoes we mention the following: The *Pert-planter* of Charlier is a narrow rim of iron forged just as wide as the wall. The wall is cut away at its lower margin to the depth equal to the thickness of this iron rim, which is neatly inserted in the groove thus made. Its design is to prevent the wear of the wall by the contact with hard roads. It is based upon the theory that the entire base of the hoof-walls, bars, frog, and sole should come upon the ground at the same time.

The four-calkin shoe, invented by Robert Bonner, is one of the greatest improvements of modern farriery. Two of the calkins, made oblong, are welded onto the web of the heels of a plain shoe, while the other two are placed at the inner edges of the forward arches of the quarters. It increases the articulation of the foot, prevents the danger of slipping, and protects the flexor tendons.

The rolling-ball shoe of Dr. David Roberge is another valuable hospital shoe. It is solid at the bottom, being round or convex in shape at the base. If there is any soreness in the joints, muscles or tendons, the rolling-ball shoe will enable the horse to revolve and ease the foot in such a position as will relieve the strain upon the injured part.



A SOUND FORE-FOOT PREPARED FOR THE SHOE.

Copied from Stonehenge's *Horse in the Stable and the Field*.

A, A, the heels of the crust; B, the toe cut out to receive the clip; C, C, the quarters of the crust; D, D, the bars as they should be left, with the full frog between them; E, E, the angles between the heels and bars, where corns appear; F, F, the concave surface of the toe; G, G, the bulbous heels; H, the cleft.

The wing-heeled centennial shoe follows the wall to the heels, and then turns with the inflexion of the wall and covers the bars. It has been found to relieve horses with weak heels or quarter-cracks and to be valuable for saddle-horses that have to bear forehanded, the extra weight of the rider.

There are many other patterns, especially of rimmed shoes, some plain like the English black, and some corrugated like the American form of Mr. Goodenough. But they present nothing novel either in theory or design.

The hoof-expander of F. P. Roberge, veterinary surgeon in New York, consists of a peculiarly formed spring contrivance which is introduced into the under portion of the hoof, and exerts a constant gentle pressure against the outer walls of the hoof, thereby preventing contraction in form where there is a tendency in that direction. From contraction, or wiring-in of the quarters, result shortness of gait, soreness, corns, and frequently quarter-cracks. The hoof, or horny box is apparently the same to the horse as a shoe is to man. When the horn of the sidewalls presses against the sensitive parts within the hoof, corns are produced in the same way as when we wear tight shoes. Roberge's hoof-expander is intended to prevent this.

One of the main requisites in horse-shoeing is the greatest possible lightness of the shoes, consistent with the use of the horse, their smallest size, and the least possible number of nails consistent with their secure fastening to the wall of the hoof. It was shown by a French hippopathologist, Bouley, that an ounce of artificial weight at the foot is equal to a pound at the shoulder. Besides, it has been found that light shoes not only wear as long as heavy ones, but that they are much less apt to fall off the feet. The nails should also be light and smooth, and must be driven so as to have a short, thick, transverse hold, rather than extending high up, which splits the wall.

The cruel practice of overheating the shoes and burning the hoofs for a close fit, has been mostly discarded as an injury to the texture of the horn. The shoes are now only slightly heated, and in many cases, where they are carefully made, they are fitted entirely cold.



Horseshoes made of rawhide, pressed into the proper shape and dried, have been recommended. Although they are hard enough to be serviceable and lasting they have never come into extensive use.

HORVÁTH, MICHAEL, Hungarian historian, born at Szentes, in the county of Csongrad, Oct. 20, 1809, died at Carlsbad, Aug. 19, 1878. He studied theology at the seminary of Waitzen, took orders in 1830, in 1844 became professor of the Hungarian language and literature in Vienna, and four years later bishop of Csanad. During the revolution of 1848 he held the appointment of minister of public instruction and worship, and the defeat of the Hungarians drove him into exile. Under the amnesty of 1867 he was permitted to return. Of several historical works which he wrote, three deserve special mention.

HOSMER, HARRIET G., born at Watertown, Mass., October 9, 1830; was educated at Lenox, Mass., and early displayed a taste for art. She received a few lessons in modeling in Boston, and then entered a medical college in St. Louis to study anatomy and dissection. Her first work in marble was a reduced copy of Canova's bust of Napoleon, which was soon followed by an ideal work, *Hesper*, or *The Evening Star*. In 1852 she went to Rome and became a pupil of Gibson. After two years of study and modeling from the antique, she produced the busts of *Daphne* and *Medusa*. Her first full-length figure in marble was *Enone*, completed in 1855, and this was followed, two years later, by *Beatrice Cenci Sleeping in Her Cell*. In the summer of 1865 she modeled *Puck*, of which many copies have been made. This was followed by *Will-o'-the-Wisp*. A colossal statue of *Zenobia, Queen of Palmyra, in Chains*, was her next important work, followed by a statue of *Thomas H. Benton*, the *Sleeping* and the *Waking Faun*, and a design of a memorial monument to Abraham Lincoln. In 1893 she completed her statue of *Queen Isabella of Spain*, ordered for the Columbian Exposition. Besides her skill in sculpture, Miss Hosmer has exhibited talents for designing and constructing machinery and devising new processes, especially in connection with her own art, such as a method of converting ordinary Italian limestone into marble. She has resided for many years in Rome, making occasional visits to the United States.

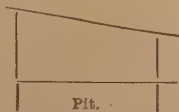
HOSPITALS, IN THE UNITED STATES. See *Britannica*, Vol. XII, pp. 301-307; *DISPENSARY*, in these Revisions and Additions.

HOST (Lat. *hostia*, "a victim"), the name given in the Roman Catholic church to the consecrated bread of the eucharist, so called in conformity with the doctrine of that church that the eucharist is a "sacrifice," in the strict sense of the word, though, in the common language of Roman Catholics, "host" is used for the unconsecrated altar-bread, and even so occurs in the offertory of the Roman missal. The host in the Latin church is a thin wafer of unleavened bread, made of the finest flour,

and bearing upon it the figure of the Crucifixion or some other emblematic device. In all ancient liturgical rites the consecrated host was broken before being consumed by the priest. In the Roman church the celebrant first breaks it in two, and then from one half detaches a fragment which he drops into the chalice. In the Greek and other Oriental churches, as well as in various Protestant communities, the eucharist is celebrated in leavened bread. The use of unleavened bread is founded on the belief that Christ could only have used such bread when instituting the eucharist at the Paschal feast. Luther followed the Roman church on this point, but did not break the host.

HOSTAGE, a person given to an enemy as a pledge for the proper fulfillment of a treaty condition. Formerly the evasion of the terms of the treaty by one of the contracting parties was regarded as entitling the enemy to put to death the hostages that had been given up to them.

HOTBED, a bed of fermenting vegetable matter, usually surmounted by a glazed frame, employed in gardening for cultivating melons and cucumbers, and tender annuals, propagating greenhouse plants by cuttings, seeds, or grafting, etc. It is inexpensive and formerly it was an indispensable adjunct to the garden, but the almost universal employment of hot water as a heating agent for horticultural purposes has latterly greatly circumscribed its use. The size of the bed is regulated by the degree of heat required for the purpose in view. A bed of stable-dung with or without leaves intermixed, four feet thick, will for sometime after it is built maintain a temperature of from 75° to 90°, which is sufficient for most purposes. As the fermentation declines the bed cools down, but heat is readily increased by adding fresh material to the sides of it. The bed should be made a few inches wider and longer than its frame, and from six to nine inches higher at the back than the front, to secure a better angle for light. The farmer's hotbed is made, in its simplest and cheapest form, as follows: In northern climates choose early in the year a dry place exposed to the south and protected from the north. Dig out a trench 18 inches deep and five feet wide. Set stakes around it, and nail boards for the frames as long as may be needed—nine or 12 feet perhaps, and cover with a fitting sash. Then fill the pit with coarse horse manure; bank the earth up against the frame and leave it until about March, when it will be time to finish it. The end of the frame should be of this shape, sloping to the south:



HOTCHKISS, BENJAMIN BERKELEY, born in Watertown, Conn., October 1, 1826, became a machinist, and in 1856 designed a field-gun on a new pattern. In 1860 he submitted to the United States Government an improved system of rifled projectiles, which was largely used during the civil war. In 1867 he introduced his revolving cannon to the European governments, and since then devised a magazine-rifle and a quick-firing gun. He died February 14, 1885.

HOTEL (Fr. *hôtel*; Lat., *hospitale*), a superior kind of inn. One point of difference between the European and the American system is that under the former, except in the case of a *table d'hôte*, the charge is for each dish ordered, while under the

American plan a fixed price is charged for the whole meal.

In their structure, interior economy, management and public uses, the hotels of this country differ materially from those of Great Britain and the continent of Europe. Much thought and labor has been expended upon the "art of hotel keeping" which has attained a great degree of perfection in the larger cities of the United States and has led to the adoption of what is now known as the American system in many of the capitals and more populous cities of Europe. This gradual change in the hotel system of Europe, and the elevation of its ancient hostleries to the higher class of building now generally devoted to the accommodation of the public, is due in great measure to the demands of Americans traveling abroad. The result is seen in the erection of such hotels as the *Grand* in Paris, the *Metropole* and the *Victoria* in London and the *Midland Hotel* in Glasgow. In America, the hotel is not only a home for transient guests, but whole families frequently take up therein a permanent residence, thus avoiding all the cares of housekeeping. The hotel itself is not infrequently upon a scale of such magnificence as would entitle it to the designation of "palace" in Europe. It is sumptuously furnished and decorated. Its chambers are counted by the hundreds, its rotunda is thronged day and night by a motley crowd not necessarily contributing one penny to the exchequer, but whom custom has licensed to enjoy certain privileges. Its parlors in time of political excitement are thronged with the adherents of one or other of the candidates, the object of the American landlord being to attract as large a crowd as possible and make his house popular. This feature of the American hotel is invariably a source of astonishment to the visiting European whose ideas of an "inn" are connected rather with snugness and quiet comfort than magnificence and ostentation. At all the summer resorts of this country are usually to be found one or more gigantic caravansaries, capable, like their city counterparts, of housing innumerable guests and forming of themselves entire communities. A notable instance was the hotel at Rockaway, L. I., which was of such an enormous length that to a person looking along its ridgepole, the curvature of the earth was distinctly apparent. This huge building was, however, totally destroyed by fire. At Brighton Beach, a popular resort of New Yorkers during the heated term, one of these monster hotels was saved from the sea, which for some seasons had been encroaching upon its foundations and threatened to engulf it, by an engineering feat which is perhaps without a parallel. The immense building was raised from its foundations by jackscrews and placed upon strong carriages built for the purpose, the wheels of the carriages resting in their turn upon a dozen or more lines of railway. Immense cables were then attached to the building and by the united power of eight locomotives the hotel was moved bodily beyond the reach of the waves. This feat was accomplished without disturbing the usual routine of the hotel, the building sustaining no serious injury while in transit.

The luxury and completeness of the American hotel system have their counterparts at sea in the magnificently equipped vessels of the transatlantic and transpacific services, which in obedience to the demands of the traveling public have become gradually transformed into great floating hotels. These splendid vessels are now replete with every comfort. They place at the disposal of their patrons handsome saloons, music and smoking rooms, and a well stocked library. Barber shops and bath rooms contribute at sea, as on shore, to the comfort of the

passengers, and not infrequently a newspaper is issued every morning giving the latest news which can be gathered aboard ship. In railroad travel, in the United States, the influence of the American hotel system is felt in the luxurious equipment of the cars as compared with those in use on European railroads under the old system.

With the invention of the elevator, which transports passengers quickly to the highest stories, the hotel has evinced of late years a tendency skyward. Structures of this character are not infrequently found, in the more populous cities, of 12 and 14 stories in height. Where care has not been taken, disastrous conflagrations have in the past sometimes followed this reckless piling up of inflammable material, and the awful holocausts at St. Louis and Milwaukee, when the Southern Hotel and the Lindell House were transformed in a few minutes to huge funeral pyres for their guests, constituted lessons which could not be easily forgotten. The utmost care is now taken to make these huge structures fire-proof, and to provide them with the most complete equipment for extinguishing any outbreak of the much dreaded element. The general adoption throughout the country of what is technically termed "the Chicago fireproof construction" has tended to greatly lessen the danger from fire in edifices of this character. Some enormous hotels, of a temporary character, were erected close to Jackson Park in Chicago upon the American plan during the holding of the World's Columbian Exposition in the summer of 1893.

HOT SPRINGS, a city and county-seat of Garland county, Ark., 55 miles southwest of Little Rock. A United States Army and Navy general hospital and a Roman Catholic school and convent are located here. In the vicinity valuable mines of gold, silver, and lead are worked. The city contains 72 thermal springs, and these are visited by large numbers of health-seekers. Pop. (1890), 8,086.

HOTTENTOT'S BREAD, a kind of yam, *Tesudinaria elephantipes*, native of South Africa.

HOT WALLS, or **FLUED WALLS**: in gardening, walls furnished with furnaces and flues, in order to produce finer kinds of fruit than could otherwise be expected in the climate. The flues are led as obliquely and make as many turns from right to left as is consistent with their drawing well, so that as little heat as possible may escape from the chimney, and as much as possible may be expended on the wall. The heat is applied chiefly during spring.

HOUDIN, **ROBERT**, French conjurer, born at Blois in 1805, died there in 1871. He studied mechanics, and, after winning a medal for his toys and automata at the Paris exhibition of 1844, opened a series of exhibitions, which he continued for ten years, retiring in 1855 with a large fortune. In 1856, at the invitation of the French government, he went to Algeria and entered into competition with the miracle-working priests. He was completely successful, and did much toward destroying their influence.

HOUGH, **FRANKLIN BENJAMIN** (1822-1885), an American author. From 1848 to 1860 he practiced medicine in Somerville, and in Albany, N. Y. At the beginning of the civil war he entered the U. S. volunteer service as a surgeon and served nine months. He then settled in Lowville, N. Y., and devoted the remainder of his life to literature.

HOUGH, **GEORGE WASHINGTON**, born in Montgomery county, N. Y., Oct. 24, 1836; graduated at Union College, 1856, and turned his attention to astronomy. In 1860 he became astronomer at Albany, N. Y., and in 1879 was made director of Dearborn Observatory, Chicago. His principal scientific work was the cataloguing of double stars,

more than 300 different stars having been discovered by him and catalogued. He was a member of several scientific societies and has published annual reports of observations taken at Dearborn Observatory.

HOUGHTON, the county-seat of Houghton county, Mich., on Lake Portage. It is a copper mining center. Pop. (1890), 2,062.

HOUGHTON, **RICHARD MONCTON MILNES**, LORD, an English author, born at Pontefract, June 19, 1809, died at Vichy, Aug. 11, 1885. He was educated at Cambridge, graduating in 1831. From 1837 to 1863 he represented Pontefract, first as a Conservative, but latterly as an Independent Liberal. In 1863 he was raised to the peerage. He championed oppressed nationalities, liberty of conscience and the rights of women; and secured the passage of a bill for the establishment of reformatories.

HOUGHTON-LE-SPRING, a town of England, in the county, and six and a half miles northeast of the city of Durham. Its growth is mainly due to the neighboring collieries. The parish church contains the altar tomb of Bernard Gilpin, who founded a grammar school here. Population, 6,041.

HOUK, **LEONIDAS CAMPBELL**, a United States Congressman, born in 1836. In 1859 he was admitted to the Tennessee bar and practiced until the beginning of the war, when he entered the Union army. He served till April, 1863, when he resigned on account of ill health. From 1866 to 1870 he was judge of the 17th judicial circuit of Tennessee, and in 1872 became a member of the legislature. He was elected as a Republican to the 47th, 48th, 49th, 50th, 51st, 52d and 53d Congresses.

HOULTON, the county-seat of Aroostook county, in the eastern part of Maine. The chief productions of the vicinity are potatoes, hay, starch, cedar shingles, and hemlock bark. Pop. (1890), 4,015.

HOUMA, a post-village, capital of Terre Bonne parish, La., on a branch of the Texas and Louisiana Railroad, 70 miles from New Orleans. It has a convent and an academy. Pop. (1890), 1,280.

HOURL, among the Mohammedans, a nymph of Paradise, whose companionship is to be one of the great felicities of the true believers.

HOURES, **THE**: in Greek mythology, the goddesses of nature and the seasons of the year. They were believed to especially personify the pleasing characteristics of the seasons. In art and poetry they were represented as blooming nymphs, decked with flowers and jewels.

HOUSATONIC RIVER, **THE**, rises in Berkshire county, Mass., follows a southerly course through Connecticut amid beautiful, wild scenery, and enters Long Island Sound after a course of 150 miles. Tide-water ascends the river for 14 miles.

HOUSE, **EDWARD HOWARD**, born in Boston, Mass., in 1836; was for many years connected with the press of that city and of New York, and also acted as foreign correspondent in Japan for the New York "Herald."

HOUSEMAID'S KNEE, the term commonly applied to an acute or chronic inflammation of the bursa, or sac between the knee-pan and the skin. Housemaids were considered especially liable to it from their kneeling to scrub on hard floors. In its acute form it causes considerable pain, swelling and febrile disturbance, the swelling being very superficial and in front of the patella. The treatment in the acute form consists essentially in rest, and the use of leeches, fomentations and purgatives; if suppuration take place the sac must be freely opened and the pus evacuated. The chronic form may subside under rest, blisters, etc., or it may require incision or excision for its cure.

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HOUSE DOVES, in the laws of England and America, are protected like domestic animals.

HOUSEHOLD TROOPS: in Great Britain, troops whose special duty it is to attend the sovereign and to guard the metropolis. They comprise three regiments of cavalry: the First and Second Life Guards and the Royal Horse Guards; and three regiments of foot: the Grenadier Guards, of three battalions, and the Coldstream and Scots Guards, of two battalions each. See **ARMY**, in *Britannica*, Vol. II, pp. 578, 580.

HOUSE OF CORRECTION, a jail not under the ordinary charge of the sheriff, but governed by a keeper. The houses were originally intended for the detention of vagrants and convicted persons, compelling them to work. The persons who may be committed to them are prisoners convicted of felony or misdemeanor; persons committed on charge or suspicion of felony, or of misdemeanor, and vagrants. Any justice may commit to the house of correction persons awaiting trial and persons convicted of small offenses.

HOUSTON, **DAVID CRAWFORD**, was born in New York city December 5, 1835, and graduated at West Point in 1856. He served in Oregon until the Civil war began, and was brevetted colonel in 1865 for gallant conduct during the rebellion. He became connected with the construction of river and harbor improvements on the Atlantic coast and the upper lakes, and is a member of the board of engineers for fortifications.

HOUSTON, a city and the county-seat of Harris county, Texas, on Buffalo Bayou, 49 miles northwest of Galveston, 164 miles east-southeast of Austin, and 152 miles south of Palestine. It contains many religious and educational institutions, and manufactories of engines, machinery, carriages, etc., besides cotton factories, machine shops, and planing mills. Large quantities of cotton, maize and other products are shipped here. Population, 1880, 16,513; 1890, 27,411.

HOUTZDALE, a post-village of Clearfield county, Pa., situated on a branch of the Tyrone & Clearfield Railroad. It has a lumber mill, and much coal is mined in the vicinity. Pop. (1890), 2,231.

HOVEY, **ALVAH**, an American clergyman, born in 1820. In 1848-49 he was pastor of the Baptist church in New Gloucester, Me., and from 1849 to 1868 held a professorship in Newton Theological Institution. Since 1868 he has been president. He has written several theological works.

HOWARD, **BRONSON**, a well known American dramatist, was born in Detroit, Michigan, in 1842. After acquiring a sound education he gravitated into journalism, but in 1870 the success of his first play, *Saratoga*, determined his career. He produced in rapid succession, *Diamonds*, *Hurricanes*, *The Banker's Daughter*, his best known play; *Wives*; *Young Mrs. Winthrop*; *One of Our Girls*; *Met by Chance*; *The Henrietta* and *Shenandoah*, all of which have been received with favor and some of which

have been reproduced in England. Since 1875, Mr. Howard has resided in New York and London.

HOWARD CITY, a post-village and railroad junction of Montcalm county, Mich., 33 miles north of Grand Rapids, where lumber and shingles are manufactured.

HOWARD UNIVERSITY. See **COLLEGES**, in these Revisions and Additions.

HOWARD, **JOHN EAGER**, an American soldier and statesman, born in Baltimore county, Md., in 1752, died at Baltimore, Oct. 12, 1827. He fought in the battle of White Plains, N. Y., in 1776 as captain in a Maryland regiment, and in 1777 he distinguished himself at Germantown, where he commanded a regiment. At the battle of Cowpens, Jan. 17, 1781, Col. Howard commanded the Continentals, and led them in a bayonet charge which decided the fortunes of the day. At Entaw Springs he was severely wounded. After the war he was in Congress 1787-88, and governor of Maryland from 1789 to 1792. From 1795 to 1803 he was United States Senator from Maryland.

HOWARD, **OLIVER OTIS**, an American general, born at Leeds, Me., in 1830. After graduating at West Point in 1854 he was made instructor in mathematics there. In 1861 he became colonel of a regiment of Maine volunteers; and at the battle of Bull Run, July 21, of the same year, he commanded a brigade, and was soon after made brigadier-general. At the battle of Fair Oaks, June 1, 1862, he lost his right arm. Gen. Howard took part in the battles of Antietam, Chancellorsville, Gettysburg, Lookout Valley, Missionary Ridge, Chattanooga; commanded the right wing of Sherman's army during its march to the sea and through the Carolinas; was made commissioner of the Freedmen's Bureau, May 12, 1865, and held that office until June 30, 1872, when it was closed. In 1869 he was made president of Howard University, which had been established in Washington for the higher education of the colored people, but resigned in 1873. In 1877 he conducted a campaign against the Nez Percés Indians, and pursued them for 1,300 miles, as related in his book, *Chief Joseph*. He also defeated the Bannacks and Piutes in 1878. In March, 1886, he was promoted to be major-general, U. S. A., and succeeded Gen. Hancock in command of the Division of the Atlantic.

HOWE, **ELIAS**, an American inventor, born at Spencer, Mass., in 1819, died at Brooklyn, N. Y., Oct. 3, 1867. While working in a machine-shop at Lowell, Mass., and afterwards in one at Boston, he developed his invention of the sewing machine, and, having constructed the first machine in May, 1845, obtained a United States patent Sept. 10, 1846. He tried in vain to introduce his invention in England. On his return to Boston in 1847 he found that his patent had been infringed. For seven years he had to litigate to protect his patent rights, until, in 1854, the principal manufacturers, after being defeated in the courts, agreed to pay him royalties on the sewing machines made by them. His yearly income from this source increased to \$200,000, and the total fortune derived from his invention amounted to two millions of dollars. He received many marks of distinction for the invention.

HOWE, **JOSEPH**, governor of Nova Scotia, born at Halifax in 1804, died there June 1, 1873. He was originally a printer. In 1828 he became editor and proprietor of the "Nova-Scotian." In 1840 he was a member of the provincial cabinet, but resigned the secretaryship in 1854 to superintend the construction of the first railroad in Nova Scotia. After 1872 he became lieutenant-governor of Nova Scotia. His *Speeches* and *Public Letters* appeared in two volumes in 1858.

HOWE, JULIA WARD, an American poetess, wife of Dr. S. G. Howe, born at New York in 1819. She took a deep interest in her husband's philanthropic labors, and was a warm friend of the anti-slavery cause. During the civil war she worked zealously with the United States sanitary commission. By voice and pen she contributed to many social reforms. At the New Orleans World's Fair in 1885 Mrs. Howe was the chief of the women's department. Her poetic spirit found expression in *Passion Flowers* (1854); *Words for the Hour* (1856); *The World's Own*, and *Hippolytus*, two tragedies; *Liter Lyrics* (1866), which comprised "Poems of the War, Lyrics of the Street, Parables and Poems of Study." The most memorable of her poems is the "Battle Hymn of the Republic," which gave expression to the deep moral purpose of the war. Mrs. Howe was also a zealous worker in the cause of woman suffrage.

HOWE, SAMUEL GRIDLEY, an American philanthropist, born at Boston in 1801, died there in 1876. After studying medicine he went to Greece in 1824, where he served as surgeon in the war for independence, and was placed at the head of the surgical service. In 1831 he assisted in establishing an asylum for the blind in Boston; was appointed superintendent of the institution, and went afterwards to Europe to examine the schools for the blind. He also assisted in founding a school for training idiots, which was organized as the Massachusetts School for Idiots. In 1871 he was sent by President Grant as a member of the commission to visit San Domingo and report upon the advisability of its annexation to the United States. Howe published a *Historical Sketch of the Greek Revolution* and a *Reader for the Blind*.

HOWELLS, WILLIAM DEAN, an American author, was born at Martinsville, Ohio, in 1837. He learned the printer's trade, but he soon began to write for the papers, both prose and verse, and in 1858 he was editor of the "Ohio State Journal." In 1860 he was appointed United States Consul at Venice, and there he remained until 1865. His Italian experiences are expressed in his *Venetian Life and Italian Journeys*. After his return to the United States Mr. Howells became editor-in-chief of the "Atlantic Monthly" (1871), and is noted for the faithful portrayal of American character of the present day. A collection of his poems was published in 1873. In 1885 he removed to New York City to take charge of an editorial department in "Harper's Magazine." In 1892 he was called to the chief editorship of the "Cosmopolitan Magazine;" but shortly resigned in order to pursue more strictly literary vocations. As a writer Mr. Howells reveals himself to us as an exceedingly industrious and painstaking artist, but his work is sadly marred by over elaboration and it is absolutely devoid of any of those human touches which characterize the works of really great writers. He has succeeded in gathering around him a so-called school of modern realists, but only one or two of these have achieved anything like literary reputation, and that promises to be but of short duration. He must be credited, however, with sincere intentions.

HOY, a small coasting vessel, differing little from the sloop or smack, and often used for conveying goods from a large vessel to the shore.

HOYA, a genus of tropical plants of the order *Asclepiadaceæ*, having a five-cleft wheel-shaped corolla, and a five-leaved spreading fleshy corona. Some of the species are common in hot-houses, and from the appearance of their flowers they are called *wax-plants*.

HUANO DYING PLACE, a name given to certain "spots" at the southern extremity of Patago-

nia, to which the inhabitants of the surrounding plains repair on the approach of death to deposit their bones. Darwin and Fitzroy first recorded this strange instinct of the people. The best known of these dying places are on the banks of the Santa Cruz and Galleos rivers, where the river valleys are covered with dense thickets of bushes and trees of stunted growths.

HUBERTSBURG, a village and castle, formerly a royal hunting-seat of Saxony, 25 miles from Leipzig, built in 1721 by Prince Frederick Augustus, afterward King Augustus III., of Poland. It was much injured during the Seven Years' War; and there Feb. 15, 1763, was signed the treaty by which that war was ended. Since 1840 the castle has served as a prison, a hospital, an asylum for the insane, and a refuge for idiot children.

HUBLI, a town of Dharwar in the presidency of Bombay, stands on a good road leading to Karwar on the Malabar coast, 102 miles to the southwest. It contains (1891) 36,677 inhabitants, and is one of the principal cotton-marts in that section of India.

HÜBNER, JOSEPH ALEXANDER, baron, born at Vienna, Nov. 26, 1811. He was educated in Vienna, subsequently traveled in Italy, and on his return, in 1833, entered the service of the government. His diplomatic career began at Paris in 1837. After several minor appointments, he was ambassador there from 1849 to 1859, and was at the head of the Austrian embassy at Rome, from 1866 to 1867. Possessed of consummate ability and tact, he has managed many delicate and difficult matters. He has twice visited the United States, the second time in 1871, when he went around the globe.

HÜBNER, RUDOLF JULIUS BENNO, German painter, was born at Oels, in Silesia, Jan. 27, 1806. He studied at Düsseldorf, to which school of painting he belongs. In 1841 he was appointed professor of painting in the academy at Dresden, and was director of the picture-gallery from 1871 to 1882, in which year he died, Nov. 7, at Loschwitz, near Dresden. Among his pictures are *Job and his Friends*, *Charles V. in San Yuste*, *Frederick the Great in Sans Souci*, *The Golden Age*, and *The Dispute between Luther and Dr. Eck*. He also designed glass paintings, including some for the crypt of Glasgow Cathedral.

HUCKABACK, often shortened to "huck," a coarse kind of linen cloth, figured somewhat like damask, and used especially for table-cloths and toweling.

HUDSON, a post-village of Middlesex county, Mass., 17 miles northeast of Worcester. Shoes and pianofortes are manufactured here. Pop. 4,670.

HUDSON, a post-village of Lenawee county, Mich., 50 miles west of Toledo, Ohio. Carriages, spokes and butter-tubs are manufactured here.

HUDSON, a city and county-seat of St. Croix county, Wis., on St. Croix Lake, 18 miles east of St. Paul, Minn. It contains wheat warehouses, flour-mills, machine-shops, and manufactories of plows and wagons. Pop. (1890), 2,885.

HUDSON, CHARLES THOMAS, M.A., LL.D. (Can tab.), F.R.S., was born at London, England, in 1828. He entered St. John's College, Cambridge, in 1848, and was 15th Wrangler in 1852. He was President of the Royal Microscopical Society in 1888, 1889 and 1890, and elected a Fellow of the Royal Society in 1889. He is joint author with Mr. P. H. Gosse, F.R.S., of *Hudson and Gosse's Rotifera*, and is the discoverer of *Pedalion mirum*, and of numerous new genera and species of Rotifera.

HUDSON, HENRY NORMAN, an American essayist, born at Cornwall, Addison county, Vt., in 1814, died at Cambridge, Mass., in 1886. He graduated at Middlebury in 1840, and taught school in Kentucky

and Alabama for some time. At Huntsville, Ala., a lady teacher from New England advised him to read Shakespeare, and his enthusiasm eventually resulted in the endowment of a professorship of Shakespeare in Boston University.

HUDSON BAY, a gulf or inland sea, in the north-east of North America. It is completely landlocked except on the north, where Southampton Island and Fox Channel lie between it and the Arctic Ocean, and where Hudson Strait, running 500 miles southeast, connects it with the Atlantic. Including its southeastern extension, James's Bay, it measures about 1,000 miles in length, and 600 in average width, and has an area of some 500,000 square miles. The eastern shore, called the East Main, is for the most part rocky, and is fenced with several small islands; the western shore, the West Main, is generally flat. This sea is the great drainage reservoir of the Canadian northwest territories. Of late years a movement has been on foot for opening up a direct communication from England with Manitoba, and the northwest of Canada by way of Hudson Bay and strait. The scheme provides for a railway from Winnipeg to Fort Nelson, on the bay, a distance of 650 miles, of which 40 miles were constructed by the end of 1890. The chief objection to the project is that the strait is only navigable for about three months annually. This route would effect a saving of 775 miles as compared with the route by way of Montreal, and of 1,150 as compared with that by New York.

HUEFFER, FRANCIS, musical critic and Provençal scholar, was born at Münster, in Westphalia, in 1845, studied at Berlin, Leipzig, and Paris, and settled in London in 1869. He soon became an authority on music, was musical critic of the "Times," and was recognized as the champion in Britain of Wagner and Wagnerian music at the time when the Wagnerian controversy was at its height. In 1869 he edited the Provençal poet, Guillem de Cabestan, and in 1878 published *The Troubadours; a History of Provençal Life and Literature in the Middle Ages*. Two works on Wagner were from his pen—one in 1874, the other in the "Great Musician" series, in 1881. He died January 19, 1889.

HUGER, BENJAMIN, an American general, born at Charleston, S. C., 1806. After graduating at West Point, he became a captain of ordnance in 1832, and was made chief of ordnance to Gen. Scott's army in the Mexican war. In 1855 he became major U. S. A.; but in 1861 he entered the Confederate service as brigadier-general and rose soon to be major-general. As such he commanded at Norfolk when the National forces captured the place, May 10, 1862. Huger quickly withdrew, after having fired the navy-yard; the *Merrimac*, and some other vessels. Subsequently he led a division in the seven days' fight in front of Richmond. After the war he became a farmer in Virginia.

HUGGINS, WILLIAM, an English astronomer and spectroscopist, born in London, Feb. 7, 1824, and educated at the City school and by private instructors, giving much attention to the experimental study of the physical sciences and of astronomy. In 1852 he was elected a member of the Microscopical Society, and was for several years engaged in the study of physiology, animal and vegetable, with the microscope. In 1855 he built a private observatory at Upper Tulse Hill, near London, and began what proved to be the principal work of his lifetime—his well-known spectroscopic observations and photographing of stellar spectra, the solar corona, etc. Mr. Huggins is a member of various scientific societies; was president of the Royal Astronomical Society from 1876 to 1878, and President of the British Association for 1891.

HUGHES, BALL, sculptor, born in London, England, January 19, 1806; died in Boston, Mass., March 5, 1863. He studied for seven years with a modeler and sculptor, and exhibited specimens of his work at the London Society of Arts, for which he received several silver medals. Among these achievements was an original composition, *Pandora Brought to Earth by Mercury*, which gained him a gold medal. He afterward made a number of ideal statuettes and many busts. In 1829 he went to New York city, and began work by making a statue of Alexander Hamilton, which was placed in the rotunda of the merchants' exchange. He also made a monumental relief of Bishop Hobart, now in the vestry of Trinity Church. Later, Mr. Hughes went to Dorchester, Mass., where he modeled *Little Nell*, and *Uncle Toby* and *Widow Wadman*, which are preserved in plaster at the Boston Athenæum.

HUGHES, DAVID EDWARD, F.R.S., was born in London in 1831. He subsequently emigrated with his parents to the United States. He is one of the greatest living experts in mechanics and the physical sciences. His career dates from 1850, when on account of his great musical talents he was appointed professor of music at the college of Bardstown, Ky. His first great invention was that of the printing telegraph which bears his name, which in 1855 became a practical success. He failed to introduce the invention into England, but it was adopted in the United States, and by the French, Italian, Russian and numerous foreign governments. In 1878, Professor Hughes invented the microphone, in 1879 the induction balance. In 1880 he was elected a Fellow of the Royal Society. In 1881 he represented Great Britain as one of the commissioners at the Paris Electrical Exposition. He has received numerous orders of knighthood, medals and diplomas from foreign governments and learned societies. His microphone is now universally employed as transmitter to the telephone.

HUGHES, REV. HUGH PRICE, a celebrated Wesleyan preacher, who was born in 1847, at Carmarthen, South Wales. He was educated at University College, London. His first appointment was at Dover, and he preached afterwards at Brighton, Oxford and London. He was then appointed to his present position as superintendent of the West London Mission. He has been exceedingly zealous in all kinds of social reforms. He published several works looking to this end. He is the editor of the "Methodist Times," an active worker in the cause of total abstinence, and a permanent member of the Methodist conference.

HUGHES, JOHN (1797-1864), an American Roman Catholic archbishop, born at Annaboghan, County Tyrone, Ireland, in 1797. After emigrating to America he worked first as a gardener; then studied theology at Mount St. Mary's College, Emmitsburg, Md., where he supported himself by taking care of the college garden, and afterwards by teaching in the college. As priest he had charge of some churches in Philadelphia till 1838, founded St. John's Orphan Asylum, and established the "Catholic Herald." In 1842 he became bishop of New York. He then organized the Roman Catholics against New York's public school system and instituted a system of parochial schools. In 1850 the diocese of New York had so increased by immigration that Hughes was made archbishop. During the war he used his influence in behalf of the integrity of the Union. Secretary Seward sent him and Thurlow Weed to Europe in 1861, to set before the foreign governments the true object in conducting the war, and during the draft riots in 1863 he urged upon the excited population of New York

the duty of submission to the United States Government.

HUGHES, THOMAS, author of *Tom Brown's School Days*, born at Uffington, Berks, England, Oct. 23, 1823. He was educated at Rugby under the celebrated Dr. Arnold, and at Oxford. Called to the bar in 1848, he became queen's counsel in 1869, and was in Parliament from Lambeth from 1865 to 1868, and from Frome in 1869 to 1874. He became early associated with the work of social and sanitary reform among the London poor, and took a prominent part in the debates relating to trades-unions and the law of master and servant. His best known work, *Tom Brown's School Days* (1856), is a truthful picture of life at Rugby, written from the author's own boyish impressions. It was followed by *The Scouring of the White Horse* (1858); *Tom Brown at Oxford* (1861); *Alfred the Great* (1869). In 1880 he assisted in founding a settlement in the United States, an account of which he published under the title of *Rugby, Tennessee* (1881). He has also written lives of Daniel Macmillan (1882), and Bishop Fraser (1887).

HUGO, VICTOR MARIE, VICOMTE, a French poet and romance writer, born at Besançon, Feb. 26, 1802, died May 22, 1885. His father being a general in Napoleon's army, young Hugo's childhood was chiefly spent in moving from France to Italy, and from Italy to Spain, but he received, nevertheless, an excellent education. At fourteen he produced a tragedy; at twenty published his first set of *Odes et Ballades*, and with the publication of *Cromwell*, in 1827, his reputation was established throughout France. In 1831 he published *Nôtre Dame de Paris*, and his best play, *Marion Delorme*. These were followed by *Le Roi s'amuse* (1832); *Lucrèce Borgia*, (1833); *Ruy Blas* (1838); and *Hernani* (1839); and the two celebrated volumes of lyric verse, *Les Feuilles d'Automne* (1831), and *Les Voix Intérieures*, in 1837. After the publication of *Les Rayons et les Ombres*, in 1840, Hugo attempted but little in pure art for a number of years, devoting himself to the pursuit of politics and the practice of oratory, journalism, and pamphleteering in prose and verse. Until 1830 he was a royalist; between 1830 and 1848 he was a Napoleonist, with a turn for humanitarianism; and later, as a member of the Assemblée Législative, threw in his lot with the democratic republicans. In 1852, after the coup d'état, he withdrew to Jersey, and in his exile wrote *Napoléon le Petit*; *Les Châtiments*, a great achievement in political and personal satire; *Les Contemplations*; *Légende des Siècles*; and in 1862 his masterpiece in prose, *Les Misérables*. These were followed by *William Shakespeare*, 1864; *Les Chansons des Rues et des Bois*, 1865; *Les Travailleurs de la Mer*, and *L'Homme qui Rit*. After the 4th of September, 1870, Hugo returned to France, and a few months later was chosen to represent the department of the Seine, but soon resigned his seat. In 1876 he was made a senator. Among his later works are *L'Année Terrible*, 1872; *Quatre-Vingt-Treize*, 1874; *Histoire d'un Crime*, 1877; *Le Pape*, 1878-79; *L'Ane*, 1880; *Les Quatre Vents de l'Esprit*, 1881, and *Torquemada*, 1882.

HULL, ISAAC, an American naval officer, who greatly distinguished himself in the war with Great Britain in 1812. He was born at Derby, Conn., March 9, 1775. In 1798 he became lieutenant and served with credit in the West Indies and the Mediterranean. For his capture of the *Guerriere* he was given a gold medal by Congress. He died Feb. 13, 1843.

HULL, WILLIAM, an American general, born at Derby, Conn., in 1753, died at Newton, Mass., in 1825. He studied law and was admitted to the bar in 1775. He joined the American army at Cam-

bridge as captain, fought at White Plains, Trenton and Princeton, and was then promoted to be major. Afterwards he was engaged at Ticonderoga, Stillwater, Saratoga, Monmouth and Stony Point. After the war he practiced law at Newton, Mass., and was prominent in the Massachusetts legislature. In 1798 he was appointed judge of the court of common pleas, and in 1805 he became governor of Michigan Territory. At the outbreak of the war of 1812 Hull commanded the northwestern army, consisting of raw militia. He had to yield up Detroit and the entire Northwest to the English. For this he was court-martialed and sentenced to be shot, but President Madison pardoned him on account of past services. In 1824 he published the *Campaign of the Northwest Army*. His *Life* was published by his daughter, Mrs. M. Campbell.

HULL, PROF. EDWARD, director of the geological survey of Ireland and professor of geology in the Royal College of Science, Dublin, was born in Antrim, Ireland, May 21, 1829. He early developed a taste for geological studies, to which he determined to devote his life. He was appointed on the Irish survey in 1869, from which he did not permanently retire until its completion in 1890. During the intervening years he visited Arabia, Persia and Palestine, and made a geological and topographical survey of the Arabah Valley and adjoining territories between the Sinaitic Peninsula on the south and Southern Palestine on the north. Prof. Hull has contributed largely to scientific literature.

HULLAH, JOHN PYKE, an English musical composer, born at Worcester, June 27, 1813, died in London Feb. 21, 1884. He studied at the Royal Academy of Music, and in 1840 began popular singing-classes in London, continuing the work for over 20 years. He was for some time professor of vocal music in King's College, and from 1874 to 1882 was inspector of training-schools for the United Kingdom. His comic opera, *The Village Coquette*, was published in 1886. Of his songs, *The Three Fishers* and *The Storm* attained wide popularity.

HUMBERT I., RENIER CHARLES EMMANUEL JEAN MARIE FERDINAND EUGENE, KING OF ITALY, born March 14, 1844, being the son of Victor Emmanuel. He attended his father during the war of Italian independence in 1859. In 1866, when Italy fought with Austria, the prince took the field as commander of a division in Gen. Cialdini's army, and was present at the disastrous battle of Custoza, June 23, 1866. After Rome was occupied in 1870 by the Italian troops, he took up his residence there, and upon the death of his father, Jan. 9, 1878, succeeded to the throne of Italy. In November of the same year an attempt was made to assassinate him, but failed. When the would-be assassin was condemned to death Humbert commuted his sentence to imprisonment at hard labor. During the cholera epidemic at Naples he exposed himself frequently in his endeavors to alleviate the sufferings of the sick and dying. By these and other actions of kindness and sympathy the king won the affection of the Italian people.

HUMBOLDT, a post-village of Humboldt county, Iowa, the seat of Humboldt College. Liquor and gambling saloons are rigidly excluded from the village. Pop. (1890), 1,075.

HUMBOLDT, a city of Allen county, Kan., situated on Neosho River, 86 miles from Lawrence. It is a railroad junction and has various manufacturing. Pop. (1890), 1,367.

HUMBOLDT, a city of Richardson county, Neb., on the Big Nemaha River and on the Atchison and Nebraska Railroad, 21 miles northwest of Falls City. Pop. (1890), 1,114.

HUMBOLDT, a railroad junction of Gibson county, Tenn., situated 128 miles west of Nashville. It has mills and a foundry, and educational institutions supervised by Odd Fellows. Pop., 1,837.

HUME, PATRICK (1641-1724), an eminent statesman and covenanter, lord chancellor of Scotland, who in 1690 was created Lord Polwarth, and in 1697 Earl of Marchmont.

HUMERAL, an oblong scarf worn by priests and sub-deacons round their shoulders at certain parts of the service of the mass and of benediction, the paten, pyx, or monstrance, being also wrapped in it (so as to prevent contact at those times with naked hands).

HUMPHRY, SIR GEORGE MURRAY, an eminent English anatomist, was born July, 1820, at Sudbury, Suffolk, England. He became professor of anatomy in 1866 at St. Bartholomew's hospital at Norwich. He was made professor of surgery at Cambridge in 1883. He is the author of several treatises on surgery. He was knighted in 1884.

HUMPHREY, HEMAN, an American clergyman, born at West Simsbury, Conn., in 1779, died at Pittsfield, Mass., in 1861. He studied theology at Yale College, and was a Congregational pastor at Fairfield, Conn., from 1807 to 1817, and then in Pittsfield. From 1823 to 1845 he was president of Amherst College, to the character, growth and prosperity of which he largely contributed.

HUMPHREYS, ANDREW ATKINSON (1810-83), an American general and engineer, born at Philadelphia. As lieutenant of artillery he distinguished himself in the Florida war in 1835. In 1838 he became first-lieutenant of Topographical Engineers. From 1845 to 1849 he had charge of the Coast Survey Office, and afterwards began the topographic and hydrographic survey of the delta of the Mississippi. This work he resumed in 1857, after he had examined the river deltas in Europe and studied the means employed there for protection against inundations. During our civil war he became a brigadier-general, was engaged at the battles of Fredericksburg, Chancellorsville and Gettysburg, and commanded a corps in the siege and capture of Petersburg, and in the pursuit and capture of Lee's army. In 1866 he was engaged in engineering work on the Mississippi.

HUMPHREYS, DAVID, an American general born at Derby, Conn., in 1752, died at New Haven in 1818. In the Revolutionary war he was aide-camp to Gen. Putnam, and then to Gen. Washington. He distinguished himself at the siege of Yorktown in 1781. In 1784 he went to Paris and London as secretary of legation to Benjamin Franklin, John Adams and Thomas Jefferson, who negotiated treaties of commerce and amity with European powers. In 1790 President Washington appointed him minister to Portugal, where he remained till 1794. In 1797 he was transferred to the court at Madrid as minister plenipotentiary, where he stayed till 1802. On his return from Spain he imported 100 merino sheep, and for some time thereafter he engaged in the manufacture of woollens at Derby. In the war of 1812, Humphreys commanded the Connecticut troops as brigadier-general. Humphreys was noted as a poet and wit. He helped in producing the *Anarchaid*, and other satiric verse; he also published *An Address to the Armies of the United States*, and other poems.

HUNGARIAN POLITICAL PARTIES. The legislative power of Hungary is vested in the emperor of Austria as king of Hungary, the delegations and a Reichstag, consisting of a house of magnates and a house of representatives. The former comprises 286 hereditary peers, some

50 high ecclesiastical dignitaries of the Roman Catholic, Greek and Protestant churches, 82 life-peers, all the archdukes who have attained their majority, delegates from the diet of Croatia-Slavonia, and others—460 magnates in all. The house of representatives contains 453 members, elected by open voting and limited suffrage for periods of five years. The present house was elected in June, 1892. The parties are distinguished as Liberals, Moderates, Independents, the Croatian delegates, who usually vote with the Liberals, and Nationalists, who vote now with one party and now with another. The Liberals number 250; the Independents, who aim at the liberation of Hungary from all but the monarchical tie with Austria, are 80; and the Moderates, numbering 56, accept the constitution of '67. Until 1890 M. Tisza commanded the support of the majority in the chamber, but finding his authority waning after fifteen years' leadership he has now retired, and sits as a simple deputy, his place at the head of the ministry being taken by his colleague, Count Szapary, who was minister of agriculture in the Tisza cabinet.

HUNT, ALFRED WILLIAM, an English painter, was born in Liverpool in 1830. He first exhibited in the Royal Academy in 1854, became a member of the Hogarth Club and was the center of the pre-Raphaelite force. Mr. Hunt is generally considered to be one of the most distinguished followers of Turner, and the chief upholder of the system of landscape art which endeavors to unite truth of light and poetical feeling with fidelity to nature.

HUNT, HENRY JACKSON, born in Detroit, Mich., September 14, 1819; graduated at West Point in 1839, served on the Canadian frontier, and distinguished himself in Mexico, where he was twice wounded. He became captain in 1852, and major in 1861, held an artillery command at Bull Run, and became aide to McClellan. In September, 1862, he was made brigadier-general of volunteers. As chief of artillery of the army of the Potomac he fought at Gettysburg, in the army of the Rapidan to Petersburg, and became brigadier and major-general, United States army. He was president of the artillery board, was retired from active service in September, 1883, and became governor of the Soldiers' Home at Washington, D. C. He died February 11, 1889.

HUNT, LEWIS CASS, born in Wisconsin, February 23, 1824; graduated at West Point in 1847, served on the Pacific coast, and in the Peninsular campaign of 1862. He was wounded at Fair Oaks, received various brevets up to that of brigadier-general in the regular army, and served as colonel of infantry until his death in September, 1886.

HUNT, ROBERT, F. R. S., born September 6, 1807, at Devonport, England; is the keeper of mining records at the Museum of Practical Geology, and was the first appointed professor of mechanical science to the government school of mines. He is best known by his work on *Photography*, published in 1842; *Researches on Light*, *The Poetry of Science*, and *Panthea, or the Spirit of Nature*, 1849; *Elementary Physics*, 1851; and *Manual of Photography*, 7th ed., 1857; and is the editor of three editions of *Ure's Dictionary of Arts, Manufactures, and Mines*.

HUNT, THOMAS STERRY, an American chemist and geologist, born at Norwich, Conn., in 1826. He studied chemistry under Prof. Benjamin Silliman at Yale College. In 1847 he entered upon the duties of geologist and mineralogist in the geological survey of Canada under Sir William Logan. While holding this position he was for some years also professor of chemistry in McGill College, Montreal. In 1872 he became professor of geology in

the Massachusetts Institute of Technology. Prof. Hunt has published many important papers on chemistry, mineralogy, and geology, which have appeared in the "American Journal of Science," and in other scientific periodicals of both Europe and America.

HUNT, WILLIAM HENRY, born in Charleston, S. C., in 1824; was educated at Yale and practiced law in New Orleans. In March, 1876, he was appointed attorney-general of Louisiana, and in the fall of the same year was the Republican candidate for the same office. There was a dispute over the election, and the Hayes administration recognized the Democratic contestants. In 1878 Mr. Hunt was appointed judge of the court of claims, and in March, 1881, he became secretary of the navy in the Garfield cabinet. This position he held until 1882, when he was appointed United States minister to Russia. He died in St. Petersburg, Feb. 27, 1884.

HUNT, WILLIAM HOLMAN, an English painter, born in London in 1827. Admitted a student of the Royal Academy in 1845, he exhibited his first picture in the following year. In his earlier work he generally took his subject from one of the poets. The first of his work executed in the pre-Raphaelite manner was *A Converted British Family Sheltering a Christian Missionary from the Persecution of the Druids*. Other works are: *Our English Coasts* (1853); *The Light of the World* (1852-54); and *The Awakened Conscience* (1854). The result of several prolonged visits to the East appeared in *The Finding of Christ in the Temple* (1854); *The Shadow of Death* (1874) and the *Triumphs of the Innocents*, executed in two versions (1875-85). In 1888-89 he painted *The Choristers of Magdalen College, Oxford, Singing the May-day Hymn*. An important mosaic by Mr. Hunt, entitled *The Child Jesus in the Temple*, intended for Clifton College chapel, was exhibited in 1890.

HUNT, WILLIAM MORRIS, an American painter, born at Brattleboro, Vt., in 1824, died at Isles of Shoals, N. H., in 1879. In 1846 he entered the Royal Academy at Düsseldorf, for the purpose of studying sculpture. But after a few months he removed to Paris to become a pupil of Couture in painting. Having returned to America in 1855, he opened studios both at Boston and Newport, settling finally at Boston, where he taught painting with great success.

HUNTER, DAVID, an American soldier, born at Washington, D. C., in 1802, died there in 1886. After he became a captain of dragoons, in 1833, he was assigned to frontier duty, and twice crossed the plains to the Rocky Mountains. In the Mexican war (1846) he was chief paymaster of General Wood's command. When President-elect Lincoln went to Washington in February, 1861, Hunter accompanied him. On May 14, 1861, he became colonel of the 6th United States cavalry. During the war he commanded a division at Bull Run, where he was wounded. In August, 1862 he became major-general of volunteers, and successively commanded the Western and Southern military departments. To provide for the fugitive slaves, General Hunter organized the 1st South Carolina volunteers, which was the first regiment of black troops in the National service. Upon this, Jefferson Davis issued a proclamation declaring Hunter an outlaw, who, if captured, should not be treated as a prisoner of war, but held in close confinement and executed as a felon. In May, 1864, Hunter was placed in command of the department of West Virginia. He defeated a Confederate force at Piedmont, on June 5, 1864.

HUNTER, ROBERT MERCER TALIAFERRO, an American statesman, born in Essex county, Va., in 1809, died there in 1887. After studying law at the

Virginia University, he was elected to Congress in 1837 and was chosen speaker in 1839. In 1845 he was again returned to Congress, and in 1847 he entered the United States Senate, where he was a leading advocate of States' rights till July, 1861, demanding the right of the slaveholder to carry his slaves to any United States territory. Being an active Secessionist he became secretary of State in the Confederate cabinet, but was soon superseded by J. P. Benjamin. After this he was elected to the Confederate Senate, and became an opponent of Jeff. Davis's administration. In 1885 he was appointed a collector of customs by the United States Government.

HUNTER, SIR WILLIAM WILSON, born July 15, 1840; educated at the universities of Glasgow, Paris and Bonn; in 1862 entered the civil service of India, and after filling the offices of secretary to the government of Bengal and to the supreme government of India, was in 1871 appointed director-general of the statistical department of India. He was one of the first recipients of the order of the Star of India, in 1878, and in 1887 was knighted. Sir William Hunter has also received honorary degrees from the Universities of Oxford, Cambridge and Glasgow, and is a member of many learned societies in Europe and Asia.

HUNTER, SIR WILLIAM GUYER, K.C.M.G., M.P., eldest son of the late Mr. Thomas Hunter, of Catterick, Yorkshire, was born in 1831, and educated at King's College, London, at Aberdeen University, and at various hospitals. He entered the Indian medical service, Bombay presidency, in 1850, and served through the Burmese war and the Indian mutiny. In 1876 he was appointed principal of the Grant Medical College; and in 1879 vice-chancellor of the University of Bombay. He retired in 1880, and in 1883 went out to Egypt to serve on the cholera commission. For his services on this occasion he was made a K.C.M.G. In 1885 he entered parliament as Conservative member for Central Hackney, and was again returned for the same constituency in 1886.

HUNTING AND GAME LAWS OF THE UNITED STATES. The "open seasons" for hunting the various kinds of game in the several States, as given in the following paragraphs, have been carefully compiled from the latest published reports of the State laws.*

ALABAMA. (Throughout the State, except in the counties named below.) Deer, October 20 to February 14; wild turkeys, October 20 to May 1; turtle doves, August 1 to April 1; quail, September 15 to March 15; wild ducks, October 1 to May 1. In Perry county—Deer, October 20 to February 14; wild turkeys, October 1 to May 1; doves, August 1 to March 1; quail, October 15 to March 1; wild ducks, October 1 to May 1; snipe and robin, not protected. In Green and Pickens counties—Deer, September 15 to February 1; wild turkeys, September 15 to April 15; doves, August 1 to April 1; quail, October 15 to March 15; wild ducks, October 1 to April 1. In Lamar county—Deer, October 1 to April 1; wild turkeys, October 1 to May 1. In Barbour county (beat 5)—Wild turkeys, October 20 to May 1; quail, September 15 to May 1; doves, August 1 to May 1. In Lawrence county—Deer, partridge, quail, rabbit, September 1 to April. Possession and transportation of game limited to open season.

Night-shooting and use of sneak-boats in hunting wild ducks forbidden.

ARKANSAS. Wild duck, doe, fawn, September 1 to February 1; wild turkeys, September 1 to May 1; pinnated grouse, September 1 to February 1; quail, October 1 to March 1. Possession of game during close season prohibited. Taking grouse, quail or prairie chickens with nets, etc., except on one's own land, forbidden. Use of nets at mouths of streams, etc. (except minnow seines), prohibited.

CALIFORNIA. Quail, partridge, grouse, rail, September 10 to March 1; doves, June 1 to January 1; male antelope, deer, July 1 to December 15; female antelope, elk, mountain

*The reader is also referred to an extended work on *The Law of Field Sports* prepared by Geo. Putnam Smith, of the New York "Sun."

sheep, doe, spotted fawn, absolutely protected; netting quail, partridge or grouse, prohibited; speckled trout, brook or salmon trout, April 1 to November 1; salmon, except when caught with net or seine, between sunrise on Saturday and noon on Sunday, which is in that event, close season, September 1 to July 31; shad, December 31 to April 1. Possession of game during close season prohibited.

COLORADO. Partridge, pheasant, prairie chicken and grouse, October 1 to November 15; elk, deer, buffalo, antelope, October 15 to January 1; mountain sheep, protected until April 7, 1885; trout, or other food fish, July 1 to November 1. Possession of game restricted to open season, but dealers may import from other States. Netting or trapping game animals or fish forbidden; also the killing of any wild animal merely for its skin, forbidden; also the killing of more animals than are needed for food, forbidden. Birds, except the above named four, are protected.

CONNECTICUT. Wood-cock, quail, partridge, gray squirrel, October 1 to January 1; wild duck, geese, November 1 to May 1; bobolink, rice-bird, robin, lark, September 1 to February 1; rail, September 1 to January 1. In New Haven, Fairfield and Litchfield counties, August 20 to January 1; trout, July 1 to April 1. Possession of game restricted to the open season. Wood-cock, ruffed grouse and quail must not be carried out of the State. It is unlawful to hunt with gun and dog within the inclosed premises of another, whether persons or corporations, without permission from the owner, agent or occupant thereof, provided such owner shall have placed six printed signs or notices, in six different conspicuous places on said premises, each board notice to be at least one foot square, and the letters to be plainly made. §6. Any person violating section five of this act shall be deemed guilty of a misdemeanor, and shall be fined not less than \$7, nor exceeding \$25, exclusive of any damage by trespass.

Insectivorous birds, including robin and lark, can be killed only on one's own land.

DELAWARE. Oortolan, rail, reed-bird, September 1 to January 1; pheasants, quail, wood-cock, hares, rabbits, November 15 to February 15. In Kent, Sussex and Newcastle counties, November 15 to January 15. Possession of game limited to open season. Transportation of partridges, quail, wood-cock or rabbits, killed in the State, for sale out of the State, forbidden. Night-shooting, netting or trapping game; use of ferrets, or of artificial light to catch muskrats, forbidden. Non-residents may not kill game or game fish without license from the Delaware Game Protective Association. Any non-resident found trespassing upon any private property with either dog or gun, not having license from the Delaware Game Protective Association, is liable to be arrested where found trespassing, on a charge of misdemeanor, and fined \$20, and in default of payment, imprisoned not less than ten nor more than twenty days.

DISTRICT OF COLUMBIA. Partridge and quail, November 1 to February 1; pheasant, August 1 to February 1; wood-cock, July 1 to February 1; prairie chicken, September 1 to February 1; snipe and plover, September 1 to May 1; wild duck, wild goose, and wild brant, September 1 to April 1; water-rails, ortolan, reed-bird, and deer, September 1 to February 1; deer, August 15 to January 15; shad and herring, January 1 to June 1. Possession of game during close season prohibited. During fishing season, viz., from January 1 to May 30, there is a close season every week, beginning at sundown on Saturday and ending at midnight on Sunday—during which time all nets, seines, etc., must be taken from the water. Trapping and snaring of wild birds and water fowl; use of gun other than shoulder gun for shooting and killing wild duck, wild goose, and wild brant; killing or shooting any bird or wild fowl in the night-time; shooting or carrying a gun in the open air on Sunday; taking black bass and salmon by other means than by hook and line, prohibited.

FLORIDA. Deer, wild turkeys, quail, partridge, in all the counties wherein the county commissioners have published the law, September 1 to April 1. Sea-birds and birds of plumage, protected at all times. Non-residents desiring to hunt game of any kind, must obtain license from clerk of county where they wish to hunt, paying therefor \$25. Not more than five persons may be included in one license, and for each additional person, \$5. No one, except a citizen of the United States, can kill birds for their plumage on any lands or waters of the State or within a marine league of the coast.

*The Act of Congress of June 15, 1878, also provides as follows:

Sec. 15. Enacts that any person who shall knowingly trespass on the lands of another for the purpose of shooting or hunting thereon, after due notice, or notice as provided for in the following section by the owner or occupant of lands, shall be liable to such owner or occupant in exemplary damages to an amount not exceeding \$100, and shall also be liable to a fine of \$10 for each and every trespass so committed. The possession of implements of shooting on such lands shall be presumptive evidence of the trespass.

Sec. 16. That the notice referred to in the preceding section shall be given by erecting and maintaining sign boards at least 8 by 12 inches in dimensions on the borders of the premises, and at least two such sign boards for every 50 acres. Penalty for erecting and maintaining such sign boards is not less than \$25, nor more than \$25 for each such sign board, and the eggs, nests and young of wild birds protected.

It is unlawful to hunt or fish upon the lands of another, without permission of the owner or occupant, under a penalty not to exceed \$20, or imprisonment, though ten days' notice by poster must be given, and such notice must be posted in three conspicuous places around the premises sought to be protected.

GEORGIA. Wild turkey, partridge, October 15 to April 1; summer ducks, doves, August 15 to April 1; wood-cock, August 15 to January 1; insectivorous birds, October 1 to April 1; buck, November 1 to March 1, and May 1 to September 1; doe, fawn, July 1 to January 1; snipe, October 1 to March 1. Possession of game during close season, prohibited. Trapping or snaring of game or birds, prohibited. In this State there are numerous local laws which affect particular counties, and which vary considerably in their provisions—so much so as to make it important that hunters should examine the local law of the county embracing their selected hunting ground.

ILLINOIS. Wild duck and goose, August 1 to April 15; prairie chicken, sage-hen, grouse, pheasant, July 15 to February 1; buffalo, elk, antelope, mountain sheep, September 1 to January 1. In Ada county, grouse, prairie chicken and duck, September 1 to March 1. Taking fish, except with rod or pole and hook and line, prohibited.

ILLINOIS. Deer, wild turkeys, September 1 to January 15; pinnated grouse, August 15 to December 1; ruffed grouse, quail, October 1 to January 1; wood-cock, July 4 to January 1. Possession of game limited to five days after season closes. Black and other bass, salmon and other game fish can be caught with hook and line only from February 15 to June 15. Use of explosive or medicinal compounds to catch fish, netting and trapping game birds (except wood-cock), night shooting of wild fowl, forbidden. No person who has not resided 60 days in the State may kill wild game. None but residents of Bend, Fayette, Effingham, Marion, Clay, Richmond, Hamilton, Wayne, Warren, Henderson and Jersey counties may kill deer or game birds for sale out of these counties.

INDIANA. Deer, October 1 to January 1; quail or pheasant, October 15 to December 20; wild turkeys, November 1 to February 1; prairie hens or chickens, September 1 to February 1; wood-cock, July 1 to January 1; wild duck, September 1 to April 15; fish (with gig or spear), January 1 to March 1. Fishing with hook and line allowed at all times and all places. Possession of game limited to open season. Fishing in the St. Joseph and Kankakee Rivers allowed in any manner between April 1 and June 1. In the Ohio River without any restrictions. Netting or trapping quail, pheasant, prairie chickens or wild duck of any kind or variety prohibited. Taking fish with net or seine, gun or trap of any kind, or set-net, wire, or pot in any of the lakes, ponds, rivers or small streams, except in the Ohio, St. Joseph and Kankakee Rivers, prohibited. Shooting at wild pigeons at or within half mile of any pigeon roosting or nesting (when they are nesting) prohibited. Trespass on inclosed lands is punishable by a fine.

IOWA. Pinnated grouse, September 1 to December 1; wood-cock, July 10 to January 1; ruffed grouse, quail, wild turkeys, October 1 to January 1; wild ducks, geese, brant, August 15 to May 1; deer and elk, September 1 to January 1; beaver, mink, otter, muskrat, November 1 to April 1; bass and wall-eyed pike, June 1 to April 1; salmon and trout, February 1 to November 1. No fish but minnows may be caught from July 1 to October 1. Twenty-five of each kind of game may be taken for five days after season closes. Transportation of game restricted to within the State, and one dozen in any one day from any one person to any other one. Trapping game, birds, deer or elk; use of any but shoulder gun; use of poison for birds or fish; spearing or gaffing fish from November 1 to May 31 are forbidden. No one shall in one day kill more than 25 each of quail, wood-cock, prairie chickens and pheasants.

KANSAS. Pinnated grouse, September 1 to January 1; quail, November 1 to January 1. Insectivorous birds—Wild geese, ducks, hawks, harrier, blue-jay, crow, snipe, curlew, plover, piper, bittern, heron, crane and wood-pecker not protected. Possession of game allowed ten days after season closes. Snaring of game or game fish, hunting with explosive substances without owner's consent; killing fish by explosive substances forbidden. All birds protected except wild geese, ducks, hawk, harrier, blue-jay, crow, snipe, curlew, plover, piper, bittern, heron, crane and wood-pecker.

KENTUCKY. Deer, September 1 to March 1; quail, partridge, pheasant, October 1 to March 1; wild turkey, wild duck, teal or other duck, September 15 to May 1; wood-cock, June 1 to January 1; wild turkey, September 1 to February 1; squirrels, January 15 to February 1. Taking fish by any other contrivance except hook and hand-line prohibited. Possession of game limited to close season. Trapping game animals; taking fish with net or other contrivance (except trotlines and gigs and minnow-nets), or use of any deleterious substance or explosive agent, except in the Ohio and Cumberland Rivers, below the mouth of Rockcastle River, and lakes in the Ohio and Mississippi River bottoms prohibited.

*The Kentucky law also enacts that any person knowingly trespassing upon the land of another for the purpose of hunting or fishing, after public notice by the owner or occupant is liable to such owner or occupant to an amount not exceeding \$25, besides all actual damage said owner or occupant

LOUISIANA. Buck, doe, fawn, October 1 to March 1; wild turkey, October 1 to April 15; quail, partridge, pheasant, October 1 to April 1. Possession and transportation of game during close season prohibited. Insectivorous and song birds protected, unless they prove destructive to fruit or grain crops.

MAINE. Moose, deer, caribou, October 1 to January 1; mink, beaver, sable, otter, fisher, muskrat, October 15 to May 1; wild ducks, September 1 to May 1; ruffed grouse, woodcock, September 1 to December 1; quail, pinnated grouse, September 1 to January 1; plover, August 1 to May 1; salmon, April 1 to July 15; with hook and line, October 1 to April 1; landlocked salmon, trout, togue, May 1 to October 1; black bass, Oswego bass, white perch, July 1 to April 1. Possession of ruffed grouse, or partridge, and woodcock allowed during September, October and November to be consumed as food; of landlocked salmon, trout and togue during February, March and April. No person shall have in possession in open season more than one moose, two caribou or three deer. Possession of over 50 pounds of landlocked salmon, trout or togue at any one time for purpose of transportation prohibited. Transportation of game, birds or fish during close season prohibited. In Maine there are local laws which apply to particular lakes, ponds and rivers, and which require attention only to the localities. Hunting or killing moose, deer or caribou with dogs; taking of mackerel, herring, pogies and menhaden by use of purse or drag-net in small bays, inlets, harbors or rivers, and other objectionable methods of taking other kinds, mentioned in detail in the statutes, prohibited. No weir, hedge or set-net shall extend more than two feet depth of water at ordinary low water. Between April 1 and July 15 there shall be a weekly close of 48 hours between sunrise on each Saturday morning and sunrise on the ensuing Monday morning, during which time no salmon, shad, shayvines or bass shall be taken. During the close time all seines or other movable apparatus shall be removed from the water; but this does not apply to the Kennebec, Androscoggin or Penobscot Rivers, or their tributaries, or to St. Croix River below the breakwater at the ledge. Private fishing grounds may be protected by posting notices in the manner specially prescribed. Insectivorous birds are protected.

MARYLAND. Quail partridge, November 1 to December 24; woodcock, June 15 to February 1; pheasant, August 15 to January 1; rabbit, October 15 to January 15; squirrel, September 1 to December 25; plover, sand piper, November 1 to January 1; mink, otter, muskrat, December 15 to March 15; wild turkey, January 1 to September 15. Wild Water Fowl—No person shall, at any time, in, on or over the waters of the State of Maryland, shoot at, or shoot any water fowl banded in flocks, either upon the feeding or roosting grounds of said water fowl, or elsewhere, or from any vessel, boat, float, canoe or any craft of any kind whatever; nor shoot at any wild water fowl from any booby blind, or artificial point erected at a greater distance than 100 yards from the natural shore from which the same be extended; nor shoot any water fowl while flying above their breeding grounds, or elsewhere over the waters aforesaid, from any vessel, boat, float, canoe or craft of any kind—reserving, nevertheless, to any citizen of any county bordering on the waters aforesaid, and to whomsoever they may extend the privilege, the right to shoot from boats other than sink boats or sneak boats. Possession of game limited to open season. The above are State laws. There are in addition many local regulations, varying in the different counties.

MASSACHUSETTS. Woodcock, August 1 to January 1; ruffed grouse, October 1 to January 1; quail, October 15 to January 1; wood, or summer duck, black duck, or teal, or any of the so-called duck species, September 1 to April 15; pinnated grouse, protected at all times; plover, snipe, sand piper, rail or any of the so-called shore, marsh or beach birds, July 15 to May 1; wild, or messenger pigeon, gull and dove, September 1 to May 1; gray squirrel, hare, rabbit, September 1 to March 1; salmon, May 1 to August 1; trout, April 1 to October 1; smelts, June 1 to March 15; landlocked salmon, lake trout, April 1 to September 1; black bass, July 1 to December 1. Exception is made in the application of these restrictions to the Connecticut River and its tributaries. Possession of the above animals and birds prohibited during close season, except in case of quail, which may be held in possession from October 15 to May 1, and pinnated grouse, wild pigeons, and any of the so-called shore, marsh, or beach birds, or any of the so-called duck species, at any season, if not taken or killed within the State. Use of ferrets, battery or swivel guns, torch or jack-lights; netting or trapping game (except partridges, hares or rabbits, between September 1 and January 1, on one's own land or by leave of owner); killing deer in or within 200 yards of pond or river; killing at

any time prairie chicken, except on one's own land, and placed there by land-owner; use of deleterious substances or other means than rod and line to catch salmon, trout or bass, are forbidden. Owners of land may be protected by posting notices in the manner prescribed by statute.

MICHIGAN. Deer (in upper peninsula), August 15 to November 15; deer (lower peninsula), November 1 to December 1; wild turkeys, October 1 to January 1; woodcock, August 1 to January 1; ruffed grouse, wood, teal, mallard and gray ducks, September 1 to January 1; water fowl, snipe, September 1 to May 1; quail, November 1 to January 1; pinnated grouse, September 1 to November 1; trout, May 1 to September 1; grayling, June 1 to November 1. Possession of game allowed for eight days after season closes. No deer in red, or fawn in spotted coat, or any such skin of deer or fawn, can lawfully be possessed. Deer, ruffed and pinnated grouse, quail, and wild turkey, cannot be carried out of the State. Fish cannot be taken from fish lakes, Diamond and Stone lakes, or in any lake in Westervelt township from November 1 to April 1; nor in lakes of Kalamazoo county from March 1 to April 1; nor in lakes of Brance Lake, from December 1 to April 1. Spear- or shooting fish in these mentioned lakes; killing deer in the water or in trap or pit-fall; netting or trapping game birds; use of swivel or punt gun; shooting wild pigeons within five miles of pigeon nesting, forbidden; trespass on inclosed lands punishable.

MINNESOTA. Elk, moose, deer, November; quail, ruffed grouse, September 1 to December 1; wild duck, goose, September 15 to January 1; woodcock, July 4 to November 1; prairie chicken, white breasted or sharp-tailed grouse, August 15 to October 1; aquatic fowls, September 1 to May 15; speckled trout, April 1 to October 1. Possession of game limited to open season. Night shooting prohibited. Transportation of game out of State forbidden. Deer in Stearns county can be taken only from November 15 to December 15. Fish can be taken in Stevens county by hook and line only, and in Lake Ripley by hook and line only from March 1 to June 1. In Loon, Crystal, Lily, Madison and Miles lakes by hook and line only from March 15 to June 1. Game birds must be killed only by shooting; speckled, river, and brook trout must be taken with hook and line. No fish except white fish from any waters in the State except Lake Superior, the Mississippi, Minnesota, and St. Croix rivers can be taken except by hook and line, shooting or spear-.

MISSISSIPPI. Deer, September 15 to February 1; wild turkey, ruffed grouse, quail, October 1 to April 1; turtle doves, starlings, September 15 to February 1. In Tate county, open season for all game November 1 to March 1; in Jasper, and some other counties, wild turkey unprotected. Possession and transportation of game restricted to open season. In Jasper and some other counties wild turkeys are unprotected. In Madison and Jefferson counties, netting and trapping quail and partridge forbidden.

MISSOURI. Deer, September 1 to January 15; wild turkey, September 15 to March 1; pinnated grouse, ruffed grouse, quail, October 15 to February 1; woodcock, July 1 to January 1; turtle dove, meadow lark, plover, August 1 to February 1. Possession of game during close season, forbidden. Insectivorous birds protected. Taking of fish with traps, nets, pens or pits, pinnated grouse and quail; or disturbing the eggs of wild birds or their nests (except by owner on his own premises during open season); or poisoning waters; or using explosive substances for the purpose of taking fish; or taking fish by means of seine (except a very small one), net, gill-net, trammel-net, set-net, bag, weir, bush-drag, any fish-net or dam, or any other device or obstruction (unless by owner in waters wholly on his own premises), prohibited. Non residents are forbidden to hunt or trap deer, fawn, wild turkey, pinnated grouse, ruffed grouse, quail, woodcock, goose, brant, duck or snipe for purpose of marketing or removing same out of State. Trespass by any one on closed land punishable.

MONTANA. Buffalo, moose, elk, black or white tailed deer, antelope, mountain sheep, Rocky Mountain goat, August 15 to December 1; grouse, prairie chicken, pheasant, fool-hen, sage-hen, partridge, quail, August 15 to November 15; beaver, otter, marten, or fisher, October 1 to April 1; wild geese and ducks, August 15 to May 15. Killing any of the above birds for sale prohibited. Hounding deer, elk, moose, or mountain sheep; catching fish with other means than hook and line (except in Missouri River below Three Forks and the Yellowstone River below mouth of Clarke's Fork) and use of explosive or poisonous substances, forbidden. Game animals can be killed only for food, and their skins cannot be taken out of the territory.

NEBRASKA. Buffalo, elk, deer, antelope, mountain sheep, turkeys, and quail, October 1 to January 1; grouse, September 1 to January 1; mink and muskrat, February 15 to April 15; pinnated grouse, September 1 to January 1. Possession of game restricted to open season. Transportation of grouse, quail, turkeys, deer, buffalo, elk, and mountain sheep at any time prohibited. Insectivorous birds protected. Deer hounding forbidden in Burt, Washington, Douglas, Sarpy, Cass, Saunders and Dodge counties. Fishing, except with hook and line, use of other than shoulder guns for wild fowl, forbidden. Trespass on land to kill or take any animal or bird, and catching fish in any private pond not more than ten acres in area, punishable.

NEVADA. Partridge, pheasant, woodcock, quail, wild goose, wood duck, teal, mallard, or other ducks, sand hill

may suffer by such trespass—presence on the lands of another with dogs or implements of hunting or fishing is evidence of the purpose of trespass. The notice referred to shall be given by erecting and maintaining sign boards at least one foot square in at least two conspicuous places on each side of the premises intended to be protected, such sign boards to have thereon the word posted, and the name of the owner or occupant of the lands. Any person who shall tear down, destroy or deface any such sign board shall be fined not less than \$5 nor more than \$25.

cranes, brant, swan, plover, curlew, snipe, grouse, robin, meadow lark, yellow hammer, bittern, September 1 to April 1; sage-cock, hen, chicken (counties of Humboldt, Elko, Eureka, and Lander, excepted), August 1 to April 1; deer, antelope, elk, mountain sheep, goat, August 1 to September 1; trout, June 1 to January 1; but between April 30 and October 31 cannot be taken for purpose of sale. Possession of game during close season prohibited. Insectivorous birds protected. Trapping or netting quail; catching any fish otherwise than with hook and line (except for scientific purposes) prohibited. Protection to owner of grounds may be secured by posting notices in two places in town.

NEW HAMPSHIRE. Deer, moose, caribou, September 1 to December 1; mink, beaver, sable, otter, or fisher, October 15 to April 1; raccoon, gray squirrel, September 1 to January 1; hares, rabbits, muskrats, September 1 to April 1; plover, yellow leg, sand piper, wood-cock, duck, rail, August 1 to February 1; ruffed grouse, partridge, quail, September 1 to February 1; land-locked salmon, lake trout, brook or speckled trout, April 30 to September 30; but during January, February and March, lake trout may be taken with single hook and line only; pike, perch or white perch, July 1 to May 1; black bass, June 15 to April 30; muscalonge, pickerel, pike, or grayling, June 1 to April 1; possession of game during close season prohibited; insectivorous birds protected.

Taking of any fish from the Pemigewasset river near the State hatchery, in Holderness, anywhere between the abutments of the upper dam of Livermore Falls and Compton and extending one-half mile below the same, prohibited.

Taking of grouse, partridge, quail, with trap or snare; or of salmon trout, lake trout, land-locked or fresh water salmon, grayling, bass, pike, pike perch, white perch, pickerel, muscalonge, in any manner other than by ordinary way of angling with single hook and line, with bait, artificial fly or spoon; or of any fish from ponds or streams for breeding purposes, or poisoning the waters thereof, or placing therein without permission of owner or lessee any fish, or the roe, spawn or fry of the same; or of white fish, black bass, land-locked salmon, grayling, pike, perch, or any other variety of fish from any of the waters of the State, and which have been placed or introduced therein by the fish commissioners, for five years after the same have been so placed therein; or of brook or speckled trout less than five inches, and of striped bass less than fifteen inches in length, prohibited. Non-residents are forbidden to take by seine or net any herring, hard-heads or mackerel from the waters of the State for the purpose of selling or barreling the same.

Owners of any lands may be protected by posting written or printed notice: offenders subject to fine of \$1 per bird; fine to be paid to owner of ground.

NEW JERSEY. Hare, rabbit, ruffed grouse, November 1 to December 15; gray squirrel, November 15 to December 15; rail, reed-bird, September 1 to December 15; wood-cock, July 1 to 31, and October 1 to December 15; English snipe, March 1 to April 31, and October 1 to December 15; marsh-hen, September 1 to December 15; deer, October 31 to December 1; wood duck, September 1 to December 31; grass plover, August 1 to December 15; prairie chicken, November 1 to December 31; black bass and Oswego bass May 30 to December 1; brook trout, April 1 to July 15. Possession of game during close season of game restricted to the open season, except quail and pheasants, which may be retained five days after season closes. Transportation of game in close season forbidden, unless killed in another State. In Barnegat bay and its tide-water tributaries north of line from Good Luck Point to Band-house, duck, geese, loosed until October 15 to May 1. Night shooting, sailing for wild fowl, or shooting from boat staked on said water, forbidden. In Mosquito Cove and its inlets ducks and brant can be shot only between sunrise and sundown on Mondays, Wednesdays, and Fridays from September 1 to May 1. Shoulder guns only to be used; trapping deer, hares, rabbits, squirrels, quail, pheasants, wood-cock, rail, reed-bird, prairie chicken, plover or ducks; shooting within quarter of a mile of wild-pigeon nest; catching trout or black bass, except with hook and line; using deleterious substances in fishing, forbidden. Non-residents must obtain a license from the Game Protection Society, if there be one whose jurisdiction covers the county wherein they intend to hunt (except for wild fowl), or to fish for trout, black bass or salmon. Owners of grounds may be protected by posting notices.

NEW MEXICO. Elk, buffalo, deer, antelope, mountain sheep, wild turkey, grouse, quail, September 1 to May 1; trout, May 1 to December 1. Possession of game limited to open season, unless brought from another State. Game may also be killed for subsistence by travelers and others in camp. Trout can be taken only by hook and line. No fish can be taken by poisonous substances. Taking fish from a private lake, pond, or stream used for propagation of fish without the owner's consent, punishable.

NEW YORK. Deer, August 15 to November 1; hares and rabbits, November 1 to February 1; moose, absolutely protected; ducks, geese, brant, September 1 to May 4; squirrels,

August 1 to February 1; quail, November 1 to January 1, and cannot set net, trap, or snare for them; wood-cock, August 1 to January 1, except in Oneida and Delaware counties, September 1 to January 1; ruffed grouse, September 1 to January 1, except in Queens and Suffolk counties, November 1 to January 1; pinnated grouse, September 1 to January 1, netting prohibited; spruce grouse, no close season; wild birds, except birds, absolutely protected, except English sparrow; trout, April 1 to September 1; bass, May 30 to January 1; salt water striped bass, no restriction; muscalonge, May 30 to January 1, except in certain localities it is May 20 to January 1; pickerel, bull heads, no restriction, except Lake George, which is closed between February 15 and July 1; pike, perch, May 30 to January 1; shad, March 15 to June 15. In Hudson River none may be taken above the Northern line of Westchester county, from sunset Saturday, to sunrise Monday. No one person shall take more than three deer during the open season. Hares and rabbits shall not be killed or hunted by ferrets. Shooting on Sunday; fishing within eighty rods of State fisheries and fish ways; drawing off water to catch fish, pollution of water, and stocking the Adirondack waters with any fish except of the salmon, and trout family, prohibited. Game killed in Rockland county cannot be carried out of it. Speckled salmon and California trout caught in Forest Preserve can be taken between May 1 and September 1. Trespassers on private grounds liable for damages, and exemplary damages, not exceeding \$25, nor less than \$15. Owners protected by posting notices.

NORTH CAROLINA. Deer, August 15 to February 15. In Clay, Cherokee, Macon, Jackson, Haywood, Transylvania, Stokes, Forsyth, Surrey, Yadkin, Crayvin, Green and Rockingham counties, partridge, quail, doves, robins, mocking birds, larks, wild turkeys, October 15 to April 1. In Currituck county, partridge and quail, December 1 to April 1; wild fowl, November 10 to March 10. In New Hanover county, partridge, quail, marsh hen, wood-cock, snipe, doves, curlew, October 15 to April 1; trout, in counties West of Blue Ridge, December 30 to October 15. In Clay, Cherokee, Jackson, Swain, Macon, Graham, Transylvania and Henderson counties, game birds are not protected. Shoulder gun only to be used for wild fowl, except in Pamlico, Dare, Carteret, Tyrrell, Currituck, Chowan and Columbus counties. Fire-arms, except bow, bow-gun, or cross-bow, prohibited. Shooting of wild fowl in Currituck and Dare counties, prohibited. Shooting wild fowl from floating battery forbidden in Carteret county. Non-residents shall not use or build blinds, boxes, batteries, or any wood decoys (ducks or geese), or live ducks or geese for decoys in Currituck, Dare or Hyde counties, for killing wild fowl; violations of statute punishable by fine not exceeding \$100, or imprisonment not less than 30 days. Grounds protected by posting notices.

NORTH DAKOTA. Deer, buffalo, elk, antelope, mountain sheep, September 1 to January 1; prairie chickens, grouse, snipe, plover, curlews, August 15 to January 1; bass, muscalonge, pike, pickerel and perch, May 1 to February 1. Killing or having for sale, or for any purpose but consumption within the State, any plover, snipe or curlew forbidden. Fishing, except with hook and line, except in Missouri and Red Rivers, and any inlet or outlet of a lake, forbidden from March 1 to October 1.

OHIO. Muskrat, mink, otter, March 1 to April 15; quail, prairie chicken, November 10 to January 31; wild turkey, October 31 to January 15; ruffed grouse, pheasant, blue winged teal, September 1 to January 1; any wild duck, September 1 to April 10; wood-cock, July 4 to January 1; turtle dove, August 1 to January 1; squirrel, June 1 to January 1; rabbit, October 1 to February 1; deer, October 15 to November 20; brook trout, salmon, land-locked salmon, California trout, March 15 to December 14. Possession of game during close season, prohibited. Insectivorous birds protected. Trapping or snaring of quail or Virginia partridge; killing wild fowl by aid of swivel or punt gun, or any other gun than a common shoulder gun, or by aid of artificial light, or sink-bait, or snare, or taking any fish, except minnows, otherwise than by hook and line from any of the waters of the State, except in private fishing waters, Lake Erie, Mercer and Sinking county reservoirs, or waters of Lake Erie West of Ann Point between June 1 and October 1, and East of Ann Point, between June 10 and October 10; in Mercer county reservoir with trammel or picket net; shooting at wild pigeons within one-half mile of human ground, or taking or destroying their eggs; use of ferret for catching rabbits, prohibited. Whoever discharges any fire-arms on any lawn, park or pleasure ground directly appurtenant to or within gun-shot of any occupied

Except in the counties included in the Forest Preserve (which are Clinton, Franklin, St. Lawrence, Essex, Warren, Herkimer, Hamilton, Lewis, Fulton, Saratoga, Washington, Greene, Delaware, Ulster and Sullivan), who deer is from May 1 to September 15. Cannot be caught except with hook and line, except in Lake Ontario, Niagara River, and wholly private waters. No net, seine, set-line, or set-pole can be used, except in Lakes Ontario and Keuka. Cannot be caught through the ice nor be disturbed in their spawning beds, except in Lake Ontario.

Except in certain localities, where it is from May 20 to January 1; in Schroon, Manopac, Paradox and Skaneateles lakes, July 1 to January 1. And Lake George and Brant lake, August 1 to January 1. Cannot be caught of less than a half pound weight or less than 8 inches long.

Except in Long Island waters, October 1 to May 1, and Chautauqua county, September 1 to February 1. Cannot be killed between sunset and daylight, nor with any net, device, or other instrument than a gun fired from the shoulder, but lantern or other light must be used.

dwelling-house, the property of another, or any charitable institution, shall be fined not more than \$20 nor less than \$5, or imprisonment not more than thirty days, or both.

OREGON. Deer, July 1 to November 1; spotted fawn, absolutely protected. No deer shall be killed except for food. Elk, moose and mountain sheep, August 1 to January 1; killing them for their skins and hams, forbidden; swan and duck, September 1 to April 1; prairie chicken and sage-hen, June 15 to April 1; grouse, pheasant, quail, July 15 to January 1; brook trout, April 1 to November 1. Possession of game limited to open season. Trapping game birds; catching trout, except with hook and line, forbidden.

PENNSYLVANIA. Turkey, October 15 to January 1; duck, September 1 to May 15; plover, July 15 to January 1; wood-cock, July 4 to January 1; quail, November 1 to December 15; ruffed grouse, pinnated grouse, October 1 to January 1; rail, reed-birds, September 1 to December 1; snipe, wild pigeons, any time; elk, deer, October 1 to December 15; squirrels, September 1 to January 1; hare, rabbit, November 1 to January 1; speckled trout, April 15 to July 15; shad and herring, January 1 to June 30; lake trout, January 1 to October 1; pickerel, June 1 to December 1; black and rock bass, pike, May 31 to January 1. Possession of elk, deer, antelope, October 15 to November 30; pinnated or ruffed grouse, quail and wood-cock, 15 days after season closes. Sunday-hunting; hounding deer, killing deer in the water if driven there by dogs; use of ferrets; of guns other than shoulder guns; of traps and traps for game and wild fowl; night-hunting for ruffed and pinnated grouse; use of nets to catch trout, bass or pickerel; shutting off water; use of explosive, etc., substances; taking trout less than five inches long, are forbidden. Non-residents must not trap or net wild pigeons without license of county treasurer.

RHODE ISLAND. Wood-cock, July 1 to January 1; ruffed grouse, robin, lark, woodcock, blue duck, gray duck, September 1 to November 1; rabbits; herring; squirrels, September 1 to January 1; grouse, heath hens, November 1 to January 1; quail, October 15 to January 1; swallow, or box marten, October 1 to May 1; grass plover, August 1 to May 1; dusky, or black duck, summer duck, blue, or green winged teal, September 1 to March 1; wild pigeon (netted or trapped), August 10 to January 1; trout, March 1 to August 15; black bass, June 1 to bird; night-hunting for ruffed and pinnated grouse, from owner of land. Trapping quail and partridges; hunting rabbits with ferrets or weasels; using punt, battery, swivel, or pivot guns for wild fowl; fishing in stream or fresh pond except on one's own land otherwise than with hook and line; catching black bass except with hook and line, forbidden. Trespass punishable.

SOUTH CAROLINA. Deer, August 1 to February 1; wild turkey, partridge, dove, wood-cock, pheasant, October 1 to March 15; fishing in Black River, August 15 to June 1. Fire hunting prohibited. All persons who have not lived a year in the State, forbidden to hunt or fish; but land owners may authorize hunting or fishing on their own land.

SOUTH DAKOTA. Deer, buffalo, elk, antelope, mountain sheep, September 1 to January 1; prairie chickens, grouse, snipe, plover, curlews, August 15 to January 1; bass, muskellunge, pike, pickerel and perch, May 1 to February 1. In Clay, Union and Yankton counties, quail, August 15 to January 1. In Clay, Union, and Lincoln counties, deer, October 1 to January 1. Killing or having for sale, or for any purpose but consumption within the territory, any plover, snipe or curlew forbidden. The same provisions as in North Dakota, with respect to fishing with hook and line.

TENNESSEE. In Henry, Dyer, Giles, Maury, Davidson, Madison, Hamilton, Bedford, and Wilson counties, deer, September 1 to March 1; pheasant, grouse, quail, partridge, wood-cock, lark, and snipe, September 15 to March 1; wild turkey, Sept. 15 to May 1. In Montgomery and Cheatham counties insectivorous birds, partridge, quail, grouse, pheasant, lark, October 15 to March 1; wood-cock, dove, wild turkey, August 1 to March 1; snipe, plover, duck, September 1 to May 1. In Robertson, Davidson, Lincoln, Shelby and Shelby counties, deer, wild turkey, partridge, quail, grouse, pheasant, wood-cock, snipe, lark and insectivorous birds, September 1 to February 1. In Rutherford, Fayette, and Tipton counties, quail and partridge, October 1 to April 1. In Lake county, deer and insectivorous birds, September 1 to February 1; wild-turkey hen, October 1 to March 1; wild turkey, September 1 to May 1; quail, September 1 to April 1. No persons except citizens of certain counties named in statute permitted to hunt game therein for profit. Taking fish otherwise than by hook and line, except in Cumberland, Tennessee, and Big Hatchie Rivers, prohibited. Owners' grounds protected, by posting notices.

TEXAS. Deer, June 1 to December 1; prairie chickens, August 1 to March 1; quail, partridge, September 1 to March 1; wild turkey, September 1 to May 1; fishing at all games with nets, seines, traps, or explosives, prohibited, except in counties especially named in statute. Hunters in Texas should consult statutes with reference to exemptions.

UTAH. Elk, mountain sheep, deer, antelope, September 1 to December 1; beaver and otter, April 1 to November 1; quail, partridge, grouse, August 1 to March 15. Possession limited to open season. Night-hunting for ducks; catching fish by poison or by other means than by hook and line (except in Bear and Utah lakes), prohibited.

VERMONT. Mink, beaver, fisher, otter, November 1 to April 1; wood-cock, August 15 to February 15; quail, wood-duck, partridge, September 1 to February 1; wild geese and ducks,

September 1 to May 1; trout, land-locked salmon, salmon trout, September 1 to May 1; black bass, wall-eyed pike, pike perch, June 15 to September 1; white fish or lake shad, any time from November 1 to 15; taking trout, land-locked salmon, salmon trout, salmon, and pond pickerel, except by hook and hand line, prohibited. Possession of game restricted to open season. Transportation of game for sale out of State forbidden. Insectivorous birds protected. In Lake Champlain and its inlets for ten miles from mouth, fishing with hook and line allowed at any time. Persons engaged in artificial raising of fish may take them in his own waters, when and how he pleases, but must not sell them for food in any State.

Use of explosives or deleterious substances to catch fish; use of nets or traps to catch trout, salmon or bass; taking black bass less than ten inches long, forbidden. Local restrictions affect fishing in Perch, Royal, Tuells, Ludlow, and Plymouth ponds, Rhines cove and Lake Bornoseen.

VIRGINIA. West of Blue Ridge Mountains, pheasants, wild turkeys, September 15 to February 1; partridges, October 15 to February 1; deer, August 1 to January 1; elsewhere in the State, partridges, pheasants, wild turkeys, October 15 to January 1; deer, August 15 to January 1; applying to whole State; wood-cock, July 1 to February 1; robin, November 1 to April 1; wild water fowl, except wood and summer ducks, and sora, September 1 to May 1; marsh hens, killing or taking its eggs later in the season than June 20, prohibited; willet, January 1 to July 20; gull, or stricker, September 1 to January 1; its eggs, from July 1 to June 1; mountain trout, April 1 to December 15; black bass, pond bass, July 1 to May 15. Possession of game during close season prohibited. Insectivorous birds protected. Netting or trapping of pheasants, wild turkeys, partridges, and all wild waterfowl, except wood duck and sora, prohibited; also taking mountain trout otherwise than by hook and line, shooting or spearing black bass or pond bass; any netting and trapping of small birds, except in counties especially exempted by statute. Non-residents are forbidden to fish in Chesapeake Bay. Hunters in Virginia should examine local laws.

WASHINGTON. Deer, elk, moose, August 15 to January 1; mountain sheep, prairie chickens, sage-hens, swans, wild ducks, August 15 to April 15; grouse, pheasant, partridge, August 1 to January 1; brook trout, April 1 to November 1. Possession of game limited to open season. Deer, elk, moose, to be killed except for food. Killing elk, moose or mountain sheep for their skins, hams or outlets forbidden. Hounding deer in Thurston, Cowlitz, Whatcombe Island and Lewis counties; taking mountain brook or bull trout, except with hook and line; duck-shooting between 8 P. M. and 5 A. M.; use of sink-boats, battery, swivel or punt gun forbidden.

WEST VIRGINIA. Deer, September 1 to January 1; quail, October 15 to January 1; wild turkey, ruffed and pinnated grouse, September 1 to February 1; wild ducks, geese and brant, November 1 to April 1; Jack salmon, white salmon, June 15 to May 1; brook trout, land-locked salmon, January 1 to September 1. Possession of game restricted to open season. Insectivorous birds protected. Fish can be caught only by hook and line from March 1 to November 1. Explosive and poisonous substances in fishing; snaring quail; use of any but shoulder gun for wild fowl; shooting within gunshot of occupied house are forbidden. Trespass on inclosed grounds punishable.

WISCONSIN. Deer, October 1 to November 10; otter, mink, marten, fisher, muskrat, November 1 to May 1; wood-cock, July 10 to December 1; quail, partridge, pheasant, prairie chicken, grouse, snipe, plover, wild fowl, September 1 to December 1. Possession of game limited to open season. Killing deer, except for food, and transporting them out of State forbidden. In Green Lake county it is unlawful to use, in wild-fowl shooting, any cover, blind or bough-house over 18 inches high. Trapping or netting deer, game birds or wild fowl; using any but shoulder guns; use of float, sneak-boat, sail or steamboat or floating box or any ambush located in open water beyond the natural cover of reeds, etc., in any lake, river, bay or inlet; hounding deer; catching trout, except with hook and line, forbidden.

WYOMING. Deer, elk, moose, mountain sheep, mountain goat, antelope, buffalo, September 1 to December 1. Killing or capturing same by means of pit, pit-fall or trap prohibited at all times. Ptarmigan, pinnated grouse, sharp-tailed grouse, sage-grouse or any other grouse or sage-hen, August 1 to November 15. Hunting in one day in the State of any of the game birds above mentioned prohibited. Avocet or other wader, or plover, August 15 to April 1; wild duck, trout, goose, August 15 to May 1; fish of all kinds, except trout, July 1 to November 1. All the above animals and birds may be taken at any time for breeding purposes. Possession and transportation of game or game birds is limited to 30 days after season closes. After expiration of 30 days after close of season, possession is prohibited, except game in transit through the territory from other States and Territories. Netting and trapping of game and game birds, use of explosive, poisonous and deleterious substances for the purpose of taking fish, or of weir, dam or other artificial obstruction, or of net, seine or other device, except hook and line, prohibited. Fishing in streams or ponds stocked by fish commission prohibited for three years after publication of notice of stocking same.

HUNTINGBURG, a post-village of Dubois county, Ind., situated in a region where tobacco is

raised extensively, and where block and cannel coal, plumbago, iron ores, potter's clay, mineral paints, lime, and sandstone are obtained. Carriages, wagons, lumber, furniture, and saddlery are here manufactured. Pop. (1890), 3,167.

HUNTINGDON, a post-borough, county-seat of Huntington county, Pa., located on the Juniata River. Lead, coal, iron, fireclay, limestone and timber abound in the region. Brooms, boots and shoes, and furniture are manufactured, and there are planing mills, a brick-yard, and several printing offices in the vicinity. Pop. (1890), 5,729.

HUNTINGTON, a city and county-seat of Huntington county, Ind., built on both sides of Little River. This is the center of a large lime-burning region. There are several factories for working wood into various shapes, a woolen mill and other manufactories. Pop. (1890), 7,328.

HUNTINGTON, a post-village of Suffolk county, N. Y., on the Atlantic Ocean, 38 miles from New York City. Bricks, pottery, and thimbles are made here, and the place is a fashionable summer resort.

HUNTINGTON, a city of Cabell county, W. Va., on the Ohio river. It has several manufactories, a State normal school, and is the seat of Marshall College. Pop. (1890), 10,108.

HUNTINGTON, DANIEL, an American painter, born at New York in 1816. He studied painting under Prof. S. F. B. Morse at the National Academy of Design, and produced the *The Bar Room Politician*, *A Toper Asleep*, and some landscapes, in 1835. In 1839 he went to Italy. There he painted *The Sibyl*, *Early Christian Prisoners*, and other works. After returning to New York he painted many portraits and some historical scenes, such as *Queen Mary Signing the Death Warrant of Lady Jane Grey*.

HUNTINGTON, FREDERICK DAN, born at Hadley, Mass., in 1819. He was at first a Unitarian pastor of a church at Boston. In 1855 he was chosen professor of Christian morals at Harvard College. His theological views then underwent a gradual change, and finally in 1860 he entered the Episcopal church. In 1864 he became rector of Emmanuel church in Boston, and in 1869 he was elected and consecrated bishop of Central New York.

HUNTINGTON, JEDEDIAH, soldier, born in Norwich, Conn., February, 1743; died in New London, Conn., September 25, 1818. He was graduated at Harvard in 1763. Early in 1775 he became captain of a regiment; on April 26th joined the American troops at Cambridge, and later aided in repulsing the British troops at Danbury, Conn. On May 12, 1777, he was made brigadier-general, and joined the American army at Philadelphia. He was one of the officers who tried Gen. Charles Lee for misconduct at Monmouth, and was a member of the court summoned to examine the case of Major Andre at Tappan. Later he was brevetted major-general, became treasurer of Connecticut, and delegate to the convention that adopted the United States constitution. In 1789 he removed to New London, Conn., where he was appointed collector of customs, and he held this office for many years. In May, 1783, he was a member of the committee of four to draft the constitution of the Society of the Cincinnati.

HUNTINGTON, SAMUEL, an American statesman, born at Windham, Conn., in 1732, died at Norwich, Conn., in 1796. He learned the trade of a cooper, but became a lawyer in 1758, when he was made king's attorney and also associate judge of the superior court of Connecticut. In 1776 he was a delegate to the Continental Congress, and as such he signed the Declaration of Independence. From 1779 to 1781 he was president of the Congress, and in 1784 he became chief justice of Connecticut.

In 1785 Huntington was elected lieutenant-governor of Connecticut, and in 1786 he became governor of that State, which office he retained till his death.

HUNTLY, a town of Scotland, county of Aberdeen. In the vicinity is the ruin of Huntly castle, the seat of the earls and marquises of Huntly. Population, 3,519.

HUNTSVILLE, a city and county-seat of Madison county, Ala., called the "Queen City of the Mountains." It has a brass and iron foundry, railroad machine shops, a female seminary (Presbyterian), a female college (Methodist), and a normal school for colored pupils. Pop. (1890), 7,995.

HUNTSVILLE, the county-seat of Randolph county, Mo. It has a college for both sexes, and in the vicinity are flour mills, a woolen mill, machine shops and coal mines. Pop. (1890), 1,826.

HUNTSVILLE, a city and county-seat of Walker county, Tex., 200 miles southeast of Austin. It contains a State penitentiary, Austin College (Presbyterian), Andrew Female Seminary and Sam Houston Normal Institute. It is a cotton-shipping point, and manufactures furniture, cotton and woolen goods, boots, and wagons. Pop. (1890), 1,509.

HURD, JOHN CODMAN, an American author and traveler, born in Boston, in 1816. Between 1840 and 1887, Mr. Hurd made extensive journeys in India, China, Japan and Egypt. He has taken an active interest in the theory of American politics, and has contributed from his pen upon this and kindred subjects several works of recognized value.

HURDY-GURDY, an ancient musical instrument of the stringed kind, something between a guitar and a lute in appearance. It has four or six catgut or wire strings attached to screw-pegs in the head; two of the strings stretch over the sounding-board to the tail-piece, and are sounded by a wooden wheel charged with rosin, which is turned by means of a handle with the player's right hand. The strings are "stopped" by an ingenious arrangement of keys, manipulated with the left hand. The remaining strings are stretched out of reach of the keys, and are tuned as drones. The instrument has a range of two octaves from the tenor G upwards. The rustic simplicity of its music made it at one time a great favorite among the peasantry of a great part of Europe (see Engel's *Musical Instruments*). The name hurdy-gurdy is also sometimes applied to the mechanical pianos familiar on the streets.

HURLBUT, STEPHEN A., born in Charleston, S. C., November 29, 1815; died in Peru, March 27, 1882. He entered the volunteer service early in 1861, and became brigadier-general, was promoted major-general after Shiloh, and succeeded N. P. Banks in command of the department of the gulf. General Hurlbut was minister to the United States of Columbia (1869-72), served in Congress from Illinois (1873-77), and in 1881 was appointed minister to Peru, where he died a year later.

HURON, the county-seat of Beadle county, S. D. On account of its situation and railroad facilities it is a leading commercial center of the State. The region is rich and prosperous. The city has an excellent system of public schools, a complete equipment of water works and electric lights, and many handsome commercial buildings and private residences. Pop. 1890, 3,038.

HURON, LAKE, remarkable for the number and size of its islands, which are mostly Canadian and very rocky, but well timbered. The commerce of the lake is facilitated by a number of good harbors and roadsteads. At Sand Beach, Mich., the United States Government has constructed an artificial harbor of refuge, having a breakwater parallel to

the shore and a pier or mole reaching out from the land at the north side. The principal natural ports on the United States side are those of Hammond's Bay, Michael Bay, Presque Isle, Thunder Bay and Saginaw Bay. Among the towns on the lake are Mackinaw City, Cheboygan, Alpena, Bay City and Port Huron, all in Michigan. On the Canadian shore are Collingwood, Southampton, Kincardine, Port Albert and Goderich. See ST. LAWRENCE, *Britannica*, Vol. XXI, pp. 178, 182.

HURON INDIANS, or **WYANDOTS**. See **INDIANS**, **AMERICAN**, in these Revisions and Additions.

HURST, JOHN FLETCHER, a Methodist Episcopal bishop, born in Dorchester county, near Salem, Md., in 1834. He studied theology at the Universities of Halle and Heidelberg, in Germany. Having returned home in 1858 he was pastor of Methodist churches in Passaic and Elizabeth, N. J., till 1866, after which he took charge of the Methodist missionary institute at Bremen, Germany. Here he remained for three years as teacher and director of the institute. In 1871 he again returned to the United States, became professor of historical theology at the Drew Seminary in Madison, N. J., and in 1873 was made president of that institution. In 1880 he was elected bishop at the General Conference at Cincinnati. He has published a *History of Rationalism; Outlines of Bible History; Martyrs of the Tract Cause; Life and Literature in the Fatherland*, and *Bibliotheca Theologica*.

HUSBAND AND WIFE, LAW RELATING TO. See Vols. XII, p. 400; XV, p. 565. In America a husband has no right to enforce his will against the will of his wife. He is not allowed to restrain her movements and actions by force, or to forcibly compel her to reside with him against her will. The laws recognize the existence of two wills in husband and wife, neither of which can be subordinated to the other and forced into submission by legal compulsion or penalties. Although the old common-law rule, that the services of the wife belong to the husband, remains in force in some of the States, yet it is practically obsolete, because the wife employs her services in his behalf only as she may choose. As the wife has the power to make contracts on her own account, she may also make contracts with her husband, and may in some of the States sue him at law upon such contracts. She may also receive conveyances directly from her husband. But this rule is not without exceptions.

As to the custody of the children in case of disagreement, the mother has acknowledged claims to all female children up to a certain age, the limit of which differs in different States. Infants belong to her by nature. A married woman's right to control her property independently of her husband's influence, to employ her services as she may choose regardless of his wishes, and to have the custody of her children up to a certain age, removes her disabilities so effectually that she is her husband's equal in every point of law, and has in addition a rightful claim to his protection and her support, even if she should not choose to contribute at all to her own personal maintenance.

HUTCHINSON, a city, railroad center and county-seat of Reno county, Kan., situated on the Arkansas River. It has a State reformatory, electric lights, Holly water works, street railroads and a telephone system. It was founded in 1871. Population in 1890, 8,682.

HUTCHINSON, ANNE (1591-1643), an American religious enthusiast, born at Alford, Lincolnshire, England, in 1591. She was the daughter of a clergyman, and married Edward Hutchinson. In 1634 she removed to New England. Anne maintained that those who were in the covenant of

grace were entirely freed from the covenant of works. She gave lectures twice a week, which were well attended. Her adherents were called "Antinomians," and included many prominent men, as Sir Harvey Vane, the governor, and the powerful preacher, Cotton. Boston was soon divided into two hostile theological camps. Mrs. Hutchinson was then tried for heresy and sedition and banished from Massachusetts, along with several of her followers. She then bought for forty fathoms of wampum the island of Aquidneck from the Narragansett Indians, and founded the town of Portsmouth. After the death of her husband, in 1642, she left Rhode Island and settled upon some land to the west of Stamford, Conn., then supposed to be within the territory of the New Netherlands. There, in the following year, she was cruelly murdered by Indians, together with her family, 16 victims in all.

HUXLEY, THOMAS HENRY, an English biologist, born at Ealing, Middlesex, May 4, 1825; commenced his education at the school in that place, and afterwards studied in the Medical School of Charing Cross Hospital. In 1846 he entered the medical service of the royal navy, and in the following year was appointed assistant-surgeon of H. M. S. *Rattlesnake*, which was commissioned for surveying service in Australasia. Huxley devoted himself to the study of the marine animals collected during the service, making them the subjects of scientific papers, which were published by the Royal and Linnean societies. Soon after his return to England in 1850 he was elected a Fellow of the Royal Society, and in 1854 was appointed professor of natural history, including palæontology, in the Royal School of Mines, and held that office, combined with the curatorship of the fossil collections in the museum of practical geology until his retirement from the public service in 1885. After his appointment to the School of Mines his attention was chiefly directed to vertebrate morphology and to palæontology. In 1856 he accompanied Dr. Tyndall on a visit to the glaciers of the Alps, and his name appears as joint-author of *Observations on Glaciers* (1857). In 1859 his large work on *The Oceanic Hydrozoa* was published by the Ray Society. He is author of numerous papers on the invertebrate, vertebrate morphology, palæontology, and of essays on topics of a philosophical and general character. Huxley has greatly interested himself in educational questions, and especially in scientific and medical education, and strongly advocated Darwin's views. He has held the offices of examiner in the University of London, of Fullerian professor at the Royal Institution, of Hunterian professor of comparative anatomy at the Royal College of Surgeons, of president of the Ethnological Society and of the British Association. He has been president and secretary of the Geological Society and of the Royal Society, and is a member of the American and Brussels Academies, a corresponding member of the Institute of France, of the Berlin Academy, and of many other foreign societies.

HYACINTH. See *Britannica*, Vol. XII, pp. 419, 256.

HYACINTHE, PÈRE. See LOYSON, Charles, in these Revisions and Additions.

HYANNIS, a post-village and seaport of Barnstable county, Mass., on the south side of Cape Cod, and on a branch of the Cape Cod (Old Colony) Railroad, 79 miles from Boston. It has a high-school, an iron foundry, a shoe factory and several churches. Its outer harbor is protected by a breakwater, and has a fixed light with an elevation of 70 feet above the level of the sea. Pop. (1890), 1,010.

HYDATID (from Gr. *hydatis*, "a watery vesicle"), a term applied to the bladder-worm stage of

certain tapeworms, particularly to that of *Tania echinococcus*. The term hydatid is sometimes applied in medicine to serous cysts which have nothing at all to do with parasites.

HYDE PARK, an inclosure of nearly 400 acres, which is one of the most popular pleasure parks in London. It adjoins Kensington Gardens. It derives its name from having been the manor of Hyde belonging to the Abbey of Westminster. See *Britannica*, Vol. XIV, p. 824.

HYDE PARK, a village of Norfolk county, Mass., on the Neponset River, and on the Boston, Hartford and Erie and Boston and Providence Railroads, 7 miles from Boston. It has excellent graded schools, a public library and various manufactories. It is chiefly a place of residence for persons who carry on business in Boston. Pop. (1890), 10,193.

HYNDMAN, HENRY MAYERS, socialistic leader, was born in 1842. He was educated at Trinity College, Cambridge, B. A., 1864, and entered the Inner Temple in 1863. He was special correspondent of the "Pall Mall Gazette" during the war between France and Italy in 1866, receiving the special thanks of his paper at the close of hostilities. He is the author of *The Indian Famine and the Crisis in India*, 1877; *England for All*, 1881; *Historic Bases of Socialism in England*, 1883; *The Social Reconstruction of England, Socialism and Slavery, A Summary of the Principles of Slavery, and Will Socialism Benefit the English People?* 1884.

HYDRA, a fabulous monster of the ancient world, said to have inhabited the marshes of Lernæa, in Argolis.

HYDRAULIC ELEVATORS are commonly employed to lift passengers or freight from one story of a building to another, though they may be put to a variety of other uses. The essential principle of an hydraulic elevator is based upon the well-known law that water will always seek its own level. The power is in proportion to the height of the source of supply, and is not dependent, as vulgarly supposed, upon the pressure of said supply. The basic principle of all such machines consists of a water-tight cylinder, in which a piston is propelled either in a perpendicular or a horizontal direction by the pressure of the water exerted upon its base. Various mechanisms are connected with this piston rod and the power exerted utilized for hoisting purposes. The discharge of the water from the cylinder produces the reverse action. Hydraulic elevators have come largely into use with the erection of tall buildings, the roofs of which are conveniently adapted for water storage purposes. The main advantage in hydraulic elevators over those run by steam or other power, is that they can be run independently of break-downs in engines which, before their adoption, were generally used for hoisting.

HYDRAULIC FORGING, shaping wrought iron and steel by the continuous power of the hydraulic press, instead of the repeated blows of a hammer. See HAMMER, *Britannica*, Vol. XI, p. 426.

HYDROCELE (Gr. *hydor*, "water," and *kele*, "a swelling"), a dropsy of the tunica vaginalis, the serous membrane investing the testis. It occurs as a smooth pear-shaped swelling, painless, but sometimes causing uneasiness from its weight. The quantity of fluid in the sac may amount to forty ounces. Hydrocele most commonly comes on without any apparent local cause, and is most frequently met with about or beyond the middle period of life, and generally in persons of feeble power; sometimes, however, it occurs in young children. The treatment may be palliative or curative. The palliative treatment consists in the use of suspensory bandages, and tapping from time to time. The curative treatment consists in set-

ting up inflammation in the tunica vaginalis by the injection of tincture of iodine, so as to obliterate the cavity, or by excision of the whole or part of the sac.

HYDROCOTYLE, a genus of umbelliferous plants, having simple umbels, entire acute petals, and fruit of two flat orbicular carpels, with five thread-like ribs, and no vittæ. The species are numerous, generally more or less aquatic, and widely distributed.

HYDRODYNAMIC ENGINES. See *Britannica*, Vol. XII, pp. 520-21.

HYDROMYS, a genus of water mice found in Australia, Tasmania, and New Guinea, distinguished from all other rodents by the small number (2-2) of molars. They are called beaver rats in Tasmania; are nocturnal and very shy; inhabit the banks of fresh and salt water, and swim well, with the help of partially webbed hind feet. The largest species is twice the size of a common rat.

HYDROPHOBIA and RABIES are fully treated in *Britannica*, Vols. XII, pp. 545-547, XX, 190-202; and the reader is referred to those volumes for exhaustive accounts of the diseases and their effects on man and beast. The researches of M. Louis Pasteur in connection with fermentation, the preservation of wines, and the propagation of zymotic diseases in silk worms and domestic animals, led him to a series of experiments on the result of which he based his announcement to the French academy in 1884, that by inoculation with prepared virus absolute protection against rabies and hydrophobia could be secured. He considers rabies a disease of parasitic origin, although the particular parasite has not yet been securely isolated. His method of treating people bitten by mad dogs is as follows:

He has found that, if he inoculates a number of rabbits from one to another in series with the virus from a mad dog—that is, if he inoculates one rabbit from the dog's virus, a second rabbit from the virus of the first, a third rabbit from the virus of the second, and so on—and then exposes the spinal cords of these rabbits in glass jars which have been free from all moisture by caustic potash, and are kept at a constant temperature of 28° C., these spinal cords lose in virulence with each day of such exposure until, after a period of 14 days, no poisonous effect results from their inoculation into a healthy rabbit or dog. They will produce milder and milder symptoms the longer these spinal cords have been kept as above described, till at last, when they have been kept for 14 days, they will upon inoculation produce no symptoms whatever. Next he has found that, if he daily inoculates the same rabbit with the virus of the modified spinal cords, beginning with the weakest virus and using a stronger one each succeeding day, at the end of the series of inoculations the strongest virus will have no ill effects whatever. The strongest virus is that from the cord of a rabbit just dead of rabies. It will cause rabies in healthy animals in 7 days, if inoculated when fresh.

An animal bitten by a mad dog, if inoculated daily with gradually stronger and stronger virus taken from the spinal cords of rabbits, was, therefore, proof against the outbreak of hydrophobia. Pasteur concluded that a person thus treated must likewise be proof against the disease. On July 7, 1885, when a boy, Joseph Meister, who had been recently bitten by a mad dog, presented himself at his laboratory, he inoculated him first with weak virus. Each succeeding day he inoculated him with a gradually stronger virus, ending this treatment on the 16th of June. The same virus that was used on the boy was tried every time on a

fresh, healthy rabbit, in order to test or "control" the inoculations. It produced rabies in the rabbits, which died in a few days; but it had no effect upon the boy, so that Pasteur considered him proof against hydrophobia from mad dogs. No deleterious effects of these graduated inoculations of the boy have since been reported.

Since that time Pasteur has performed hundreds of similar preventive inoculations. Many cases were sent to him from America, and still more from the various states of Europe. It is generally stated, that of one hundred persons bitten by mad dogs, about 18 to 20 become rabid and die of hydrophobia. By Pasteur's treatment this percentage was reduced to one-half or even less. Some physicians who are opposed to Pasteur, have maintained that there is danger of death being caused by his inoculations without reference to the effect of the dog's bite. An English commission has investigated this point, but could not find a single case of death from this cause alone. A number of wolf-bitten Russians have been sent to Paris to be treated by Pasteur. But it was found that the wolf-virus is much stronger than that of mad dogs; and several of the patients, therefore, died of rabies in spite of Pasteur's treatment. These cases must be considered as exceptional.

During the last few years a large hospital, called the *Pasteur Institute*, has been established in Paris, where dog-bitten patients are treated under Pasteur's personal supervision. In this institute hundred of victims have already been saved from a horrible death. Of the few who have succumbed to the disease it is asserted that there were other complications involved. In London a fund was raised in 1889 to enable indigent English patients to be taken to Paris for treatment at the Pasteur Institute. The efficacy of the Pasteur system, which at first encountered much opposition, is now generally recognized.

HYDROPHYLLACEÆ, a natural order of exogenous plants, containing about 80 known species, natives chiefly of the colder parts of America. The order includes some small trees and bushes as well as herbaceous plants. They are often hispid, like the *Borraginaceæ*.

HYGIERA, or **HYGEIA**: in Greek mythology, the goddess of health. She was worshiped at Athens, Corinth, Argos and other important cities, and in works of art is usually represented as a virgin with a snake, the symbol of health, which drinks from a cup held in her hand.

HYER, GEORGE, an American journalist, born in Covington, Franklin county, N. Y., July 16, 1819. After acquiring merely the elementary rudiments of an education, he was compelled, owing to family necessities, to immediately turn his attention to remunerative employment. He decided to learn the printer's trade, and was apprenticed in the job office of the Ogdensburg "St. Lawrence Gazette." While setting up type, he found leisure to devote himself to the study of surveying. He soon engaged in local work and became recognized as an expert in the field. He made several minor improvements in the theodolite and its accessories. In the year 1836 he accepted a position on the Wisconsin government survey, and removed to the city of Milwaukee in that State. During this period he wrote frequently for "The Advertiser," which was the first of the Milwaukee newspapers issued in the then infant settlement. He was appointed mail agent in 1837, and was the bearer of the first United States mail to the West, an undertaking fraught, in those days, with no inconsiderable danger. In 1838 he ventured into the newspaper business on his own account and was

quite successful, publishing and owning no less than four periodicals, two in Madison, Wis., and two in Milwaukee. He was all this time an active politician, and in 1846 was returned to the legislature, and again in 1850 and 1863. In 1846 he was also a delegate to the State constitutional convention. From 1867, until his decease on April 20, 1872, he was actively engaged in journalism, at the time of his death being connected with the "Times," of Oshkosh.

HYGIENE is the name given to that department of scientific study which deals with the causes and prevention of disease in relation to the preservation of health. It is comparatively a modern science. In this country its study has led to increased sanitary facilities in dwelling houses and an awakened interest in the question of how best to prevent the importation of contagious diseases from abroad. In the matter of public hygiene, however, the large cities are in some respect unreasonably behind the great European capitals, filth of all kinds being frequently permitted to accumulate in the streets and alleys, and remain there during the heat of summer, as a standing menace to the public health. In 1892, however, the outbreak of cholera in Europe in a great measure awakened the municipal authorities of the more populous centers to a sense of their danger. In that year the United States health officers exercised extraordinary quarantine precautions and through their vigilance an outbreak of cholera during the summer was prevented, by the detention and fumigation of all suspected vessels. With an increased knowledge of hygienic laws, the health officers of the larger cities have been better able to cope with outbreaks of disease, and such laws as have been passed for the regulation of the public health have been more rigidly enforced. Undoubtedly the people at large are beginning to be aroused to the necessity of observing the laws relating to hygiene. The householder is no longer willing to leave the sanitary appointments of his residence in the hands of ignorant plumbers, and an unprecedented interest in these matters has undoubtedly been awakened.

HYMNS. For the general history of hymns and hymnody, see *Britannica*, Vol. XII, p. 577. In America comparatively little has been done in this field. Having the literature of England to draw from, there has seemed to be little need. Some of the productions of Bishop Doane, Dr. Mühlenberg, Mr. Thomas Hastings, Mr. Edmund H. Sears, Mrs. S. E. Miles, and Dr. Ray Palmer will, however, compare favorably with those of other countries. Among modern American hymn-writers may be mentioned Bishops Cox and Burgess, and Dr. Crosswell, of the Protestant Episcopal church; Drs. W. Hunter, T. O. Summers, and T. H. Stockton, of the Methodist, and Dr. S. F. Smith, of the Baptist churches; L. W. Bacon, E. Nason, and Professors Mead and Rice, of the Congregationalists; and the Presbyterians have Drs. Robinson, Hatfield, Hitchcock, Schaff and Eddy. The popular *Gospel Hymns* fall under no denominational head. They gave currency to the productions of P. P. Bliss, Fanny Crosby (Mrs. Van Alstyne), and many others. Formerly our collections for public worship were largely composed of British hymns, but of late years hymns born on American soil occupy larger and larger places in the hymnals. More attention is being paid to hymnology, and the improvement in this department of worship is apparent.

HYPERICACEÆ, or **HYPERICINÆ**, a natural order of about three hundred species, trees, shrubs and herbaceous plants, widely distributed and in very different climates, but particularly numerous

in North America. The species of *Vismia* yield a substance resembling gamboge. Many of the *Hypericaceæ* belong to the genus *Hypericum*.

HYPNOTISM (from the Greek *hypnos*, sleep), a condition of mental insensibility to some sense impressions combined with excessive sensibility to other impressions, and total absence of self-consciousness. It is similar to somnambulism, but is artificially induced. In order to hypnotize a person the hypnotizer or "mesmerizer" concentrates the attention of the subject upon some bright object of vision, as a shining piece of glass, or upon the operator's eye, while the operator makes a few gentle strokes over the subject's hair from the top of the head to the front, or makes some passes with his hand before the eyes of the subject. Some mesmerizers merely fix their eyes firmly and steadily upon the subject's eyes, while they hold the subject by the hands. Each hypnotizer has his own particular method of producing the hypnotic state. When a person becomes hypnotic he gradually loses the sense of taste, touch and color. He cannot distinguish between hot and cold, nor between white and black, etc. Next, the forms of objects become indistinct, and can no more be distinguished. Lastly, the eyes become immovable, and nothing is seen even if the eyes are open. But, curious enough, the ear never sleeps. The subject hears and believes everything said by the operator, and finally performs every act the operator commands him to do.

Magnets have often been used as aids in bringing about the hypnotic condition, especially permanent horse-shoe magnets of steel. They were apparently quite efficacious. But a French mesmerizer made lately wooden horse-shoe magnets of the same size and shape as the steel magnets, and painted them exactly like the genuine ones. Upon making his strokes and passes with these pseudo-magnets he was able to produce the hypnotic state in sensitive subjects just as easily as with steel magnets. This proves clearly that magnetism has nothing to do with hypnotism, and that it is merely the belief of the person operated upon, and the submission of a weak will to a powerful will, that brings about the hypnotic effect.

A parallel case taken from the lower animals is reported by Professor J. Czermak, of Leipzig, in the "Popular Science Monthly," of September, 1873, pp. 618-27. He there relates the following incident: Athanasius Kircher, of Fulda, a celebrated savant and Jesuit, tied the feet of a hen together with ribbon, and laid the animal on the ground, where, after many cries and violent struggling, it became quiet. Then Kircher drew on the floor a chalk line diagonally from one eye of the hen to the other, loosened the ribbon; and the hen, although left perfectly free, remained immovable, even when he attempted to rouse her. Kircher attributed this immovability to the force of the hen's imagination.

Professor Czermak repeated the experiment first by tying a hen's legs with a ribbon and making a chalk line on the floor, as Kircher had done. It succeeded. Then he held down a hen's neck and head upon a table, until the frightened bird became quiet, and drew a chalk line on the dark surface of the table, beginning at the end of the hen's beak, and left the hen after this entirely free. Although breathing heavily, she remained motionless on the table, and even allowed herself to be turned over upon her back. Lying on her back she remained quiet until the close of the lecture during which the experiment had been performed.

Afterwards Professor Czermak performed the same experiment with wild hens, geese, ducks, turkeys, and even with a timid, unruly swan; and in

every case he dispensed with the use of a chalk line, and also with the ribbon around the bird's feet. It consisted simply in holding down the neck and head of the bird fast upon the table, until the bird became quiet and convinced that all its struggling to escape was fruitless. The subject must be convinced that it has found its master.

Professor Heidenhain conducted numerous experiments with medical men and students as his subjects. He found that, in the first or last profound stage of hypnotic sleep, the subject on being awakened can remember all that has happened during that sleep. On awakening from the second or more profound stage, the patient can only partially recollect what has happened; while, in the third or most profound stage, all power of subsequent recollection is lost. During the most profound stage he hears sounds and sees sights, etc. (that is, the power of sensory perception remains), without knowing that he hears the sounds and sees the sights, and he can therefore afterwards not recollect the impressions of sounds heard or sights seen. He is like a man whose attention is absorbed or distracted. The less profound stages of hypnotism are paralleled by the condition of *réverie*, in which a passing sight or sound, although not particularly noticed at the time, may be subsequently recalled by an effort of will.

Heidenhain also found that, even when all memory of what has passed during the hypnotic sleep is absent on awakening, it may be aroused by giving the subject a clew—just as in the case of a forgotten dream. This clew may consist of a single word. Again, he found that actions which have been previously rendered mechanical by long habit, as piano-playing, can in the hypnotic state be performed automatically upon the command of the hypnotizer. When Heidenhain held his fist before the subject's face the subject immediately performed a like movement; when he opened his hand, the subject did the same.

Awakening from the hypnotic sleep may be effected by suddenly blowing upon the face of the subject, slapping the hand forcibly, screaming into the ear, or by any sudden change in the stimulation of the subject's nerves. For further information on the subject of hypnotism the reader is referred to **MAGNETISM**, **ANIMAL**, **Britannica**, Vol. XV, pp. 277-83, and **APPARITIONS**, Vol. II, p. 205.

HYODONTIDÆ, a family of fishes represented by the toothed herrings or moon-eyes.

HYOGANOIDÆ, an order of fishes represented by the *Amioidei* and *Lepidostoides*. See **Britannica**, Vol. XII, pp. 687, 688.

HYPNUM, a genus of mosses belonging to the order *Bryineæ*. Archegonia and capsules are borne on special lateral branches. The sexual organs are formed in August and September, and the capsules take from ten months to a year to ripen. Many species are remarkable for their beauty, and are often used for decorative purposes. Their distribution is universal. See **MUSCINEÆ**, **Britannica**, Vol. XVII, pp. 70-73.

HYPOCHERIS, a genus of plants of the natural order *Compositæ*, of which one species, *H. radicata*, is common in meadows and pastures in Britain. Its rough leaves spread on the ground, and resemble in form those of the dandelion; the stem is branched; the flowers are like those of the dandelion, but smaller.

HYPOCYCLOID, a curve whose course is generated by a point in the circumference of a circle rolling on the concave side of a fixed circle.

HYPOPHOSPHITES, potassium, sodium and calcium combined with hypophosphorous acid.

HYPOTATIC UNION, a union of natures or substances so intimate as to constitute one undi-

vided person. The term is used to describe the mysterious union of the divine and human natures in Christ. See MONARCHIANISM, *Britannica*, Vol. XVI, p. 719.

HYPOSTASIS, the Greek term used to designate the distinct subsistence of the three persons of the Trinity.

HYPOSULPHITE, a salt of hyposulphurous acid. See *Britannica*, Vol. XXII, p. 636.

HYPOSULPHUROUS ACID, called also HYDROSULPHUROUS ACID, is obtained by the reduction of sulphurous acid. See *Britannica*, Vol. XXII, p. 636.

HYPOTHECATION, the mortgaging or pledging of property or goods to raise money for some critical emergency.

HYPOTHENUSE, the name of that side in a right-angled triangle which is opposite to the right angle. The well-known property of the hypotenuse, that the square described on it is equal to the sum of the squares described on the other two sides, is proved in the forty-seventh proposition of the first book of Euclid.

HYPOTHESIS, a supposition; a proposition supposed, or taken for granted, in order to draw a con-

clusion or inference for proof of the point in question.

HYPOXANTHINE, called also SARCINE or SARKINE, a white crystalline powder found in the spleen, liver, muscles and other organs of man and in the spleen and blood of the ox.

HYRACEUM, a blackish-brown viscid material, not unlike soft pitch, found in the crevices of the rocks of Table Mountain, Cape of Good Hope. It has an offensive taste, and is not unlike castoreum, for which it has served as a substitute in medicine.

HYRTL, JOSEPH, a distinguished anatomist, was born in 1811 at Eisenstadt, in Hungary; studied at Vienna, and acquired eminence as a scientific anatomist. He became professor of anatomy in Prague in 1837, and at Vienna in 1845. He has contributed not a little to the progress of comparative anatomy, especially that of fishes, and has made the anatomy of the ear a subject of very particular investigation. He has written many books and articles on the subjects above indicated. Hyrtl formed a museum of comparative anatomy at Vienna, and became rector of the university.

I

IABADIUS—IDAHO

IABADIUS, a large fertile island in the East Indies, described by Ptolemy. It was said to be near the Golden Chersonesus, and it produced much gold and grain. It is now thought to be identical with Java, but Humboldt took it to be Sumatra.

IACCHUS (*Gr.* ΙΑΧΧΟΣ), a name for the god Dionysus at Athens and Eleusis. On the sixth day of the Eleusinian Mysteries a decorated statue of Iakchos was carried from Athens to Eleusis, where the votaries were initiated into the last mysteries. Some think that Iacchus is identical with the Roman Bacchus, the son of Zeus and Semele.

IBAGUE, or **IBAQUE**, a town of the United States of Colombia, in the department of Cundinamarca, 70 miles west of Bogota. Population, 6,000.

IBERA, or **YBERA**, a cluster of marshy lakes in the province of Corrientes, Argentine Republic, between the rivers Paraná and Uruguay.

IBERVILLE, **PIERRE LE MOYNE**, **SIEUR**, founder of Louisiana, born at Montreal, Canada, July 16, 1661, died at Havana, Cuba, July 9, 1706. He entered the French navy as midshipman when 14 years old. In 1690 he was one of the leaders in the retaliatory expedition against Schenectady. In October, 1694, he captured Fort Nelson, on Hudson Bay. In 1696 he took nearly all of Newfoundland from the British, whom he defeated in the naval fights of 1697. In March, 1699, he entered the Mississippi River, and ascended it as far as the mouth of the Red River. He then built old Fort Biloxi at the head of Biloxi bay. This was the first post established in Louisiana. After going to France and returning to Louisiana in 1701 he found the settlement reduced by disease, and thereupon transferred it to Mobile, thus beginning the colonization of Alabama. He also occupied Dauphin or Massacre Island. After being made captain of a line-of-battle ship, he captured, in 1706, the island of Novis from the English. He was suddenly struck with a malady of which he died.

IBSEN, **HENRIK**, poet and dramatist, born at Skien in South Norway, March 20, 1828. In 1842 he was apprenticed to a chemist at Grimstad, but abandoned that business to devote himself to literature. His earlier efforts were of little importance. In 1850 he became a student in Christiania University, but did not remain to complete the course. After two years of journalistic work he was appointed director of Ole Bull's theater at Bergen, for which he wrote *The Banquet at Solhaug*, (1856), and *Lady Inger at Østrat* (1857), his first works of note. In 1857 he undertook similar duties for the national theater in Christiania. His next dramas, *The Warriors in Helgoland* (1858), *Love's Comedy* (1862) and *The Rival Kings* (1864), placed him in the first rank of Scandinavian dramatists. He left Norway in 1864, and has lived abroad since that time, chiefly in Rome, Dresden and Munich. The Norwegian Parliament granted him a pension in 1866. In that and the following year appeared the lyric dramas, *Brand* and *Peer Gynt*, in many respects the finest things he has done. Other works are: *The Young Men's League*; *Emperor and Galilean*; *Pillars of Society*; *A Doll's House*; *Ghosts*; *An Enemy of the People*; *The Wild Duck*; *Rosmersholm* and *The Lady from the Sea*. His later plays aroused a storm of controversy in England in 1889, as they

had done shortly before in Germany and in the Scandinavian countries. Up to that time he was practically unknown and unread in the United States, but he suddenly achieved an extraordinary popularity, and his plays were produced and his works perused in many sections of the country. Ibsen has one child, a son named Sigurd, who holds the position of secretary to the Swedish legation in Vienna. Mrs. Ibsen is the step-daughter of the Norwegian poetess, Magdalena Thoreson, who is still living, and one of whose plays, *Indoors*, was recently produced in Copenhagen at the Dagmar theater. An English translation of Ibsen's prose works in 4 vols. was edited by Mr. Archer in 1890. See *Britannica*, Vol. XVII, p. 591.

ICELAND. Our latest information from Iceland is to Feb. 1, 1892. Since 1387 the King of Denmark has been the acknowledged sovereign of Iceland. The island has its own constitution and administration, under a charter dated January 5, 1874, by which the legislative power is vested in the Althing, which is composed of thirty-six members, of whom thirty are elected by the people and six appointed by the crown. The highest local authority is the governor or stiftamtmand. At the head of the administration is a minister appointed by the King of Denmark. This minister resides at Copenhagen and is responsible to the Althing.

ICHTHYODORULITE, the name given to fossil fish spines, not uncommon in stratified rocks.

ICY CAPE, a headland of Alaska, discovered by Cook in 1778. Lat. 70° 21' N.; long. 161° 46' W.

IDAHO SPRINGS, a post-town of Clear Creek county, Col., on the Colorado Central Railroad, 34 miles west of Denver. It is surrounded by beautiful scenery, and is well known for its hot and cold mineral springs, which attract a large number of visitors in summer. Gold and silver are found in the vicinity. Pop. (1890), 1,338.

IDAHO, **STATE OF**. For general article on IDAHO see *Britannica*, Vol. XII, pp. 697, 698. Idaho is an Indian word, meaning "Gem of the Mountains." The first white man known to have set foot upon its territory was Captain Lewis, of Lewis and Clarke's expedition. He crossed the main range of the Rocky Mountains from Horse Plains (Horse Prairie), Beaver Head county, Montana, Aug. 12, 1805. The Missouri Fur Company in 1810 established a trading post on Snake River, but soon abandoned it. Fort Hall was established as a trading post by a party of traders under Nathaniel I. Withe in 1834. Gold in paying quantities was discovered in Idaho in 1860 by Captain James Pierce of Washington Territory, and the first location was on Oro Fino Creek. The first permanent settlement was made at Mount Idaho in May, 1861.

Idaho was created a Territory by act of Congress March 3, 1863, and admitted as a State July 3, 1890. Its territory was originally taken from parts of Dakota, Nebraska, and Washington Territories. Later the Territories of Montana and Wyoming were organized by act of Congress, subtracting from Idaho large portions of its territory and reducing its area to 84,800 square miles, as officially reported in the census of 1890. Idaho extends from the British Possessions on the north to Utah and Nevada on the south, a distance of about 410 miles,

and has a width from east to west of from 44 to 306½ miles.

The population in 1880 was 32,610; in 1890, 84,385, an increase during the decade of 51,775. Its capital and chief city is Boise City.

The following figures give the population of the State by counties, as shown by the census of 1890:

Counties.	1890.	1880.	In-crease.
Ada.....	8,368	4,674	3,694
Alturas.....	2,629	1,693	936
Bear Lake.....	6,957	3,235	2,322
Bingham.....	13,575	3,214	13,575
Boisé.....	3,342	3,214	128
Cassia.....	3,143	1,312	1,831
Custer.....	2,176	.....	2,176
Elmore.....	1,870	.....	1,870
Idaho.....	2,955	2,081	924
Kootenai.....	4,108	518	3,590
Latah.....	9,173	.....	9,173
Lemhi.....	1,915	2,280	.....
Logan.....	4,169	.....	4,169
Nez Percé.....	2,847	3,965	.....
Oneida.....	6,819	6,964	.....
Owyhee.....	2,021	1,426	535
Shoshone.....	5,382	469	4,913
Washington.....	5,836	879	2,957
	84,385	32,610	

Of the rugged mountains of the Bitter Root, Rocky and Wasatch ranges, the Bitter Root occupy the northern, the Rocky the central, and the Wasatch the southern links in the eastern boundary. The "spurs" of these ranges, especially the Wasatch, extend well over into Idaho, and they contain some of the best mineral belts. Their highest peaks reach altitudes varying from 9,000 to 13,000 feet. On the south and southwest are the Owyhee Mountains, which form an important link in the great divide between the waters of the Columbia and those of the Humboldt. The Sawtooth, Salmon River, Wood River and Boise are among the prominent mountain ranges in Central Idaho. On the West are the Blue Mountains of Oregon and Washington. The interior of the State is a vast plateau, varying in altitude from 600 feet above the sea in its lowest valleys to 10,000 on the tops of its highest peaks. The average elevation is from 2,000 to 3,000 feet less than that of Wyoming, Utah, Nevada or Colorado. Its numerous mountain ranges run in a variety of directions, the trend of the principal ones, however, being southeast to northwest. In the interior ranges are the mineral belts, which first attracted general attention to the territory.

The figures showing the principal elevations have been tabulated as follows:

Name.	Elevation.
	<i>Fect.</i>
Albion.....	4,400
Alturas Lake.....	6,600
American Falls.....	4,320
Atlanta.....	5,325
Bear Lake.....	5,900
Bellevue.....	5,200
Blackfoot City.....	4,523
Bloomington.....	5,985
Boisé City.....	2,800
Big Camas Prairie.....	5,000
Big Camas Prairie.....	3,500
Bonanza City.....	6,400
Burke.....	3,900
Camas Station.....	4,722
Cœur d'Alene Mission.....	2,280
Craig Mountain.....	4,080
Custer Mountain.....	8,760

Name.	Elevation.
	<i>Fect.</i>
Caribou Mountain.....	9,854
Centerville.....	4,825
Challis.....	5,400
Clawson Toll Gate.....	4,300
Custer City.....	6,660
Dry Creek Station.....	5,689
Eagle Rock.....	4,720
Estes Mountain.....	10,050
Fort Hall.....	4,783
Fort Lapwai.....	2,000
Franklin City.....	4,516
Florida Mountain.....	7,750
Florence.....	8,000
Fish Haven.....	5,932
Forks of Lolo.....	4,450
Gentile Valley (head).....	5,245
Galena City.....	7,900
Gladiator Mine.....	9,700
Hailey Lake.....	6,443
Hailey.....	5,350
Idaho City.....	4,263
Junction Station.....	6,329
Jackson Lake.....	6,806
Ketchum.....	5,700
Lewiston.....	680
Lake Pend d'Oreille.....	2,503
Lake Rock d'Alene.....	2,150
Long Valley.....	3,700
Murray.....	2,750
Malad City.....	4,700
Market Lake.....	4,795
Montpeller.....	5,793
Mouth of Port Neuf River.....	4,532
Mount Idaho City.....	3,480
Montana Mine.....	9,500
Neade Mountain.....	10,540
Malad Divide.....	9,220
Oneida Salt Works.....	6,900
Oneida (town).....	5,700
Oxford.....	4,862
Paris.....	5,306
Pocahontas.....	5,922
Paris Peak.....	5,100
Placerville.....	5,115
Putnam Mountain.....	8,933
Quartzburg.....	5,115
Rathdrum.....	2,000
Ross Fork Station.....	4,394
Ross Fork Branch.....	4,732
Rock Creek.....	4,513
Rocky Bar.....	5,200
Red Fish Lake.....	6,600
Sawtell's Peak.....	9,070
St. Charles.....	5,937
St. George.....	5,771
Salmon City.....	4,030
Soda Springs.....	5,779
Silver City.....	6,680
Sawtooth City.....	7,000
Shoshone.....	4,587
Summit, between Challis and Bonanza.....	9,100
Summit, between Boise City and Idaho.....	4,815
Summit, between Idaho City and Centerville.....	4,812
South Mountain City.....	6,450
Salmon Falls.....	3,236
War Eagle Mountain.....	7,980
Weston.....	4,600
Weiser City.....	2,340

Idaho has numerous and rapid rivers. With the exception of a comparatively small portion of southeastern Idaho, whose waters flow into the Basin of Great Salt Lake, the river system is entirely tributary to the valley of the great Columbia River. There are three important rivers in Idaho which empty directly into the Columbia—namely, the Spokane, Clark's Fork, and the Snake. Snake River meanders through the eastern, southern and western parts of the State for over 1,000 miles, and, next to Niagara, boasts the most imposing cataract on the continent—the great Shoshone Falls. It rises among the most marvelous scenes of the Yellowstone National Park, within a few feet of the crystal founts from which springs that great tributary of the Mississippi, the Yellowstone, and within sight of the headwaters of that grand inlet of the Gulf of California—the Rio Colorado. Here, at its

romantic start, the Snake is also only a day's ride from its twin torrent of the North, Clark's Fork, but soon sweeps southward 500 miles, as if to gather in the waters of wider and richer fields. Again, flowing majestically northward to mark the boundary between Idaho and Oregon, it unites, when within 400 miles of the Pacific, with the Clark's Fork system to form the Columbia. Soundings of the Snake River in eastern Idaho, near the crossing of the Utah Northern Railway, fail to discover bottom at 240 feet.

Governor Shoupin, in his report for 1889, says that conservative estimates give Idaho 13,000,000 acres of agricultural lands. Others place the amount at 20,000,000. It is safe to estimate it at 15,000,000 to 16,000,000 acres. Industrious pioneers have already brought under cultivation about 4 per cent., or 600,000 acres, expending \$2,000,000 in irrigating canals alone.

The altitude of the land governs, to a large extent, the character of its productions. The valleys of Bear Lake, Lemhi, and Custer counties are profitably cultivated at an elevation of 6,000 feet above tide water, and at 5,000 feet, oats, wheat, potatoes, turnips, etc., are raised abundantly. Timothy and a few hardy grasses flourish at these altitudes. At 4,000 to 4,500 feet all kinds of grain and vegetables are profitable, except a few tender garden products. In some localities fruit is grown successfully at 4,000 to 4,300 feet, and berries are abundant at 4,500. The Boise Valley, so prolific of all kinds of fruit, is 2,800 feet above the ocean, while the valleys of the Clearwater and Snake rivers, near Lewiston in the northwest, with an altitude of but 680 feet, revel in tropical vegetation. Thus Idaho, in addition to its invaluable mineral wealth, possesses a share of the best climatic influences of every portion of the Union.

The soil in the valleys and on the plateaus, in the eastern and southern parts of the State, is composed of vegetable matter mixed with mineral, and, in some localities, with sand and clay. On this class of soil sage-brush grows extensively. In the northwestern counties, dark loam of great depth prevails. In the gulches and near the mountains the soil is mixed with decayed rock. Alkali soil is limited to narrow strips, in widely separated localities, and rarely interferes with agriculture.

The yield of all kinds of cereals, when land is irrigated, is most gratifying, and is not surpassed by any State or Territory. The same can be said of all kinds of vegetables, while in many parts of the State tender vines produce abundantly. Fruits are excellent in quality and flavor. Apples, pears, peaches, plums, prunes, apricots, grapes, and all small fruits and berries are raised in great abundance. Huckleberries, gooseberries, and wild cherries grow wild in profusion on the mountainsides and foot-hills. The camas, which gives a name to several prairies in the State, is found in all sections. It is a bulb which is highly prized by the Indians for food.

Alternating and nestling among the mountain ranges are many valleys, large and small, affording in the aggregate a vast area of agricultural lands not exceeded in fertility by any in the world. The arable portions of the valleys lie from 600 to 6,000 feet above the sea, and they range in size from one to twenty miles in width, and from twenty to one hundred miles in length.

Traversing southern Idaho is the extensive volcanic belt on the basin of Snake River. This basin stretches far into neighboring territories, being 800 miles in length. In Idaho it averages about fifty miles in width. Some of the best valleys traverse it, but it is more noteworthy as the great winter

grazing region of Idaho and adjacent territories. Its nutritious herbs and grasses fatten thousands of cattle and sheep annually.

Idaho is in the same latitude as France, Switzerland, and portions of Italy, Spain and Portugal. It is subject to oceanic influences very similar to those countries, and necessarily has a somewhat similar climate. All this region is near enough to the Pacific Ocean to be very noticeably effected by its currents. By reference to any map whereon these ocean currents are shown, it will be seen that the great Japan current (Kuro Siwa)—that mighty stream of warm water—bears directly against the western shores of America. The temperature of the winds blowing over it is, of course, affected by its heat, and they carry their modifying influences inland hundreds of miles, even extending their genial influences upon the climate of Montana. The average or mean annual temperature at Lewiston—in northern Idaho—is 56°, a milder showing by five degrees than is made by Ohio, milder by ten degrees than Iowa, and milder by twelve degrees than Maine and New Hampshire. Boise City, in western central Idaho, with a much greater altitude than Lewiston, has an average temperature of 51°, the same as Ohio, and four degrees warmer than Connecticut.*

The amount of taxable property in the State, as reported by the county assessors for the past ten years, is as follows:

1883	\$13,938,412 00	1888	\$21,288,392 00
1884	15,497,598 00	1889	23,667,179 47
1885	16,230,530 00	1890	25,581,305 21
1886	17,021,049 00	1891	32,227,509 00
1887	20,741,192 00	1892	31,161,945 00

The outstanding indebtedness of the State on Jan. 1, 1892, was \$137,225.04. The total receipts from all sources, including cash on hand for the fiscal year 1892, were \$424,519.73; the disbursements were \$325,795.58, and the cash on hand, in all the funds on January 1, 1893, was \$98,724.15.

The values of the several metals mined in 1892 were: Gold, \$2,000,000; silver, \$4,500,000; lead, at 4 cents per pound, \$6,490,000; copper, at 10 cents per pound, \$85,600; total, \$13,075,600.

Wool-growing in the State is also largely on the increase. In 1880 there were about 50,000 sheep in Idaho; in 1893 the number was over 350,000. Other industries also show large progress.

Idaho is rich in timber, the most valuable being black, white, and yellow pine, cedar, spruce, birch, and tamarack.

The people of Idaho, being anxious to attain statehood, called a convention, which met at Boise City, July 4, 1889, and framed a State constitution. They claimed to possess the necessary population and other qualifications for admission to the Union, and incorporated in their proposed organic act a special provision against polygamy, this being directed at the Mormons, who have in the last few years settled in the territory. The action of the convention was ratified by the people, and in July, 1890, Idaho was admitted into the sisterhood of States, being the forty-fourth to join the Union.

The following is a list of the Governors, with their dates of service:

Wm. H. Wallace.....	1863-64	John P. Hoyt.....	1875-76
Caleb Lyon.....	1864-66	Mason Brayman.....	1876-80
David W. Ballard.....	1866-67	John N. Irwin.....	1880-84
Isaac L. Gibbs.....	1867-68	Edw. H. Stevenson.....	1884-88
David W. Ballard.....	1868-70	George L. Shoup.....	1888-90
Gilman Marston.....	1870-71	Norman B. Willey.....	1890-93
Thomas W. Bennett.....	1871-73		

The salary of the governor of Idaho is \$3,000.

*For a list of the mineral springs and pleasure resorts of Idaho, see those topics in these Revisions and Additions.

IDDESLEIGH, EARL OF, an English statesman, better known as **SIR STAFFORD NORTHCOTE**, born in Devonshire, Oct. 27, 1818, died in London, Jan. 12, 1887. He was educated at Eton and at Oxford, and began public life in 1843 as private secretary to Mr. Gladstone. In 1847 he was called to the bar, and four years later succeeded his grandfather as eighth baronet. In 1855 he entered Parliament as Conservative member for Dudley, was elected for Stamford in 1858 and in 1866 for North Devon, representing the latter constituency until 1885. He was financial secretary to the treasury in Lord Derby's ministry of 1859, and in 1866 was appointed by the same prime minister president of the board of trade. While at the India office in 1868 Sir Stafford Northcote had charge of the Abyssinian expedition, which under his management was carried to successful issue. In 1871 Mr. Gladstone appointed him British commissioner to the United States for the adjustment of the Alabama difficulty. He was chancellor of the exchequer in 1874, and when Mr. Disraeli went to the Upper House Sir Stafford succeeded to the leadership in the Commons. In 1885 he was raised to the peerage and appointed first lord of the treasury. He was foreign secretary in Lord Salisbury's second ministry, but resigned the post a few days previous to his death.

IDÉ, or ID, a small fresh-water cyprinoid fish, *Leuciscus idus* or *Idus melanotus* of Europe. Its flesh is esteemed. A domesticated variety, colored like the gold-fish, is known in northern Europe as the Orfe.

IDEALISM, the modern philosophical doctrine which maintains that all conceptions proceed from self-consciousness as distinguished from the doctrine that all knowledge begins with sensations. It is the opposite of "realism" and "sensationalism;" for it denies the reality of the outer world and its impressions, and maintains that all our knowledge finds its starting ground in abstract conceptions. The idealist doubts the existence of an external world, and relies solely upon an analysis of self (*Ego*).

SUBJECTIVE IDEALISM makes the innate faculties of the human mind the primary subject of investigation, and predicates a philosophical system from their intuitions and relations.

MODERN IDEALISM started with Descartes (1596-1650), was pushed forward by Baruch Spinoza 1632-1677), and was carried to extreme conclusions by Bishop Berkeley (1684-1753). The latter declared that the supposed existence of a material world was not only incapable of proof, but was also positively false. Idealism was borne to its highest visions and most perfect realizations in Germany. The most noted philosophers of this school are G. W. Leibnitz (1646-1716), Immanuel Kant (1724-1804), Fichte (1762-1814), F. W. J. Schelling (1775-1854), and G. W. F. Hegel (1770-1831). Kant, however, insisted that the material of our thoughts is in the external world.

IDELER, CHRISTIAN LUDWIG, astronomer and chronologist, born near Perleberg, in Prussia, Sept. 21, 1766, died Aug. 10, 1846. After holding various offices he received a professorship at the University of Berlin in 1821. He was author of several valuable works, which include *Historische Untersuchungen über die astronomischen Beobachtungen der Alten* (Leipzig, 1806), and *Handbuch der mathematischen und technischen Chronologie* (Berlin, 1825-26).

IDIOCY. See **INSANITY**, in these Revisions and Additions; also **Britannica**, Vol. XIII, pp. 95-113.

IDIOSYNCRASY, a peculiarity of physical or mental constitution or temperament. See **ANTI-PATHY**, in these Revisions and Additions.

IDUN, or IDUNA, the name of a goddess of Norse mythology. She was the daughter of the dwarf

Svald, but, being received among the Æsir, she became the wife of Bragi.

IGNATIEFF, NICHOLAS PAVLOVITCH, a Russian general and diplomatist, was born in 1832. He is the son of Count Paul Ignatieff, a captain of infantry, who, at the time of the military insurrection that occurred at St. Petersburg, in consequence of the somewhat forcible accession of the Grand-Duke Nicholas to the throne of Russia in 1825, was the first to pass over, with his company, to the side of the new czar—a defection which it was his duty to make in this manner in opposing the defection of the rebels, and which insured the triumph of the former, and gained for Captain Ignatieff and his family the powerful protection of Nicholas I. The subject of this notice had, at the very outset of his career, the Emperor Alexander II. for his godfather. He was educated at home and in the Corps des Pages, and, according to custom, quitted that select establishment for young aristocrats to enter the guard; and in the Military Academy, after three years' study, he was appointed as staff officer. At the beginning of the Crimean war he was ordered to be at the staff of General Berg. He occupied at Riga the post of quartermaster general of the Baltic Corps. He then passed from the military to the diplomatic service, finding his point of transition in the military attachéship to the embassy at London. His chief performance in this capacity was a report on England's military position in India, which so pleased the emperor that he summoned Captain Ignatieff to Warsaw for a personal interview. In 1858 Ignatieff, now a colonel and aid-de-camp to the emperor, was sent on a special mission to Khiva and Bokhara. He was afterwards made a major general in the imperial suite, and sent as plenipotentiary to Peking, 1860, where he concluded a treaty by which the Province of Ussuri was ceded by China to Russia. On his return to Russia he was made director of the Asiatic department in the ministry of foreign affairs. In 1864 he was appointed minister at Constantinople, where his legation was afterwards, 1867, raised to the rank of an embassy. Apart from his rank as ambassador, he was a lieutenant general, and general aid-de-camp to the emperor. The object which General Ignatieff steadily pursued at Constantinople was to secure for Russia a powerful influence over Turkey. He completely reassured the late Sultan Abdul Aziz as to the intentions of the government of St. Petersburg, while on the other hand he gained the good-will of the Christian subjects of the porte by his courteous behavior and his simulated anxiety to protect them. In the negotiations between the various European powers prior and subsequent to the war between Russia and Turkey, General Ignatieff took a very prominent part. He was recalled from the embassy at Constantinople May 2, 1878, when Prince Labanoff was sent there in his place. Afterwards he was appointed minister of the interior, from which post he was dismissed in June, 1882, on account of his Pan Slavist intrigues, and for shutting his eyes to the persecution of the Jews. He remained, however, a member of the Council of the Empire. He is a bitter enemy of the Nihilists.

IGNORAMUS (*Lat.*, we do not know), the word formerly written by a grand jury on the back of an indictment, meaning that they rejected it. The word is now used most commonly as a synonym for a blockhead.

ILION, a thriving village of Herkimer county, N. Y., on the Mohawk River. Here is located a factory where firearms, type-writers and sewing-machines are made. The celebrated Colts revolver is made here. Pop. (1890), 4,057.

ILLINOIS INDUSTRIAL UNIVERSITY (since July 1, 1885, UNIVERSITY OF ILLINOIS), at Urbana, capital of Champaign county, was established under acts of Congress of July, 1862, and July, 1866, and under acts of the legislature of Illinois Jan. 25, Feb. 28, and March 8, 1867, to "teach in the most thorough manner such branches of learning as are related to agriculture and the mechanic arts, including military tactics, and not excluding other scientific or literary studies." The University was opened in 1868, and three years later women were admitted as students. It includes the following colleges and schools: College of agriculture and horticulture; college of civil, mechanical and mining engineering, and architecture; college of natural sciences, chemistry, and natural history; college of literature and art; school of military science; and school of industrial art. The assets of the University are about \$1,000,000, with an income of about \$25,000.

ILLINOIS RIVER, the largest stream in Illinois, formed by the Des Plaines and Kankakee Rivers, which unite in Grundy county, and flow southwest, entering the Mississippi a few miles above Alton. The main stream is about 350 miles in length, and is navigable in favorable seasons as far as Peru, a distance of 250 miles. It is connected by canal with the lake navigation at Chicago.

ILLINOIS, STATE OF. For early history, government, productions and earlier statistics of Illinois, see Britannica, Vol. XII, pp. 703-06. The census of 1890 reports the area as 56,650 square miles. Population, 3,826,351; capital, Springfield, with a population of 24,842.

The cities having a population of 9,000 and over were: Alton, 10,184; Aurora, 19,634; Belleville, 15,360; Bloomington, 22,242; Cairo, 10,044; Chicago, 1,098,576; Danville, 11,528; Decatur, 16,841; East St. Louis, 15,156; Elgin, 17,429; Freeport, 10,159; Galesburg, 15,212; Jacksonville, 12,357; Joliet, 27,407; Moline, 11,995; Peoria, 40,758; Quincy, 31,478; Rockford, 23,589; Rock Island, 13,596; Springfield, 24,852; La Salle, 9,004; Ottawa City, 9,971. The city of Chicago, which ranked in respect of population as the fifth city in 1870 and the fourth city in 1880, is now the second city in the United States. The State reported a population by decades as follows: in 1810, 12,282; in 1820, 55,162; in 1830, 157,455; in 1840, 476,183; in 1850, 664,470; in 1860, 1,711,951; in 1870, 2,539,891; in 1880, 3,077,193; in 1890, 3,826,351.

The complete list of governors of the State, with their dates of official service, is as follows:

TERRITORIAL.

Ninian Edwards 1809-1818.

STATE.

Shadrack Bond	1818-20	Richard Yates	1861-65
Edward Coles	1822-26	Richard J. Oglesby	1865-69
Ninian Edwards	1826-30	John M. Palmer	1869-73
John Reynolds	1830-34	Richard J. Oglesby	1873--
Joseph Duncan	1834-38	John L. Beridge	1873-77
Thomas Carlin	1838-42	Shelby M. Cullom	1877-83
Thomas Ford	1842-46	John M. Hamilton	1883-85
Augustus C. French	1846-53	Richard J. Oglesby	1885-88
Joel A. Mattison	1853-57	Joseph W. Fifer	1888-93
William H. Bissell	1857-60	John P. Altgeld	1893--

Illinois was the second State in rank in the United States in the production of steel in 1880 and in 1890, Pennsylvania being the first. In Illinois the increase during the decade was 241 per cent. The production in 1880 was 254,569 tons; in 1890 it was 868,250 tons.

The number of pupils enrolled in the public schools of the State in 1890 was 778,319, a gain of

10.55 per cent. in ten years. In addition to those in the public schools there were 105,232 pupils in private and parochial schools. In the latter there were reported about 47,000 Catholic, 24,000 Lutheran, 4,000 German Evangelical pupils and small numbers of Protestant Episcopal, Holland Christian Reformed, Dutch Reformed and German Presbyterian children.

The State reform school is located at Pontiac, and reported, in 1890, 383 inmates.

The coal products of the State in 1890 were 12,104,272 tons, valued at \$11,755,203, and were nearly double the products of the year 1880. The coal area of the State embraces about 37,000 square miles. The employes during 1890 numbered 24,823; the wages aggregated \$8,694,347, and the grand total of expenditures in the coal business in that year amounted to \$10,366,069. The coal is bituminous and is found in 19 counties; it is used for steam and heating purposes. Coke is manufactured in Gallatin and La Salle counties.

In the value of the output of sandstone the State ranked twelfth in 1880 and twenty-fifth in 1891—the State of Ohio in both cases ranking the highest of all the States.

Illinois is a small producer of petroleum, the output being 1,400 barrels in 1889, all of it ranking as lubricating oil.

The following statistical statement conveys some idea of the progress of the State of Illinois in later years:

The finances of the State are in an exceedingly flourishing condition. In 1853 the State debt was \$17,398,985. This was much reduced in subsequent years, and during Governor Cullom's administration it was finally extinguished. From that time (1881) to the present (1893) the State has been free from public debt. The revenues of the State from all sources, from Oct. 1, 1890, to Sept. 30, 1892, were: general revenue fund, \$5,854,269.26; State school fund, \$2,091,058.17; local bond fund, \$2,641,415.85, a total revenue of \$10,586,743.28 for the period named. Expenditures during the same period were: general revenue fund, \$5,856,678.82; State school fund, \$2,126,967.90; delinquent land tax fund, \$331.06; unknown and minor heirs' fund, \$2,348.40; local bond funds, \$2,696,333.71, giving total disbursements of \$10,682,659.89. At the close of 1892, the balance of all funds in the State treasury amounted to \$4,349,551.38.

There were only four public institutions prior to 1856, viz: a penitentiary at Alton; a deaf and dumb asylum; a central hospital for the insane, and an institution for the education of the blind, the three latter being located at Jacksonville. There have been erected since that time thirteen additional institutions, viz: Three universities; an additional penitentiary, at Chester; a reformatory, at Pontiac; three insane asylums; a soldiers' orphans' home, at Bloomington; a soldiers' and sailors' home, at Quincy; an institution for the feeble-minded, at Lincoln, and an asylum for insane criminals, at Chester.

Several extremely momentous questions confronted the people of the State during the years 1892 and 1893. Foremost among these may be mentioned what were popularly known as the compulsory educational and the convict labor questions. A growing dissatisfaction with the workings of the Edwards compulsory education law first found expression in the insistance of the German Lutherans, a large and influential body, of a right to establish and maintain schools of a denominational character. Just prior to the State elections, a political coalition was formed between the Lutherans and the Catholics, and the State, which for

years had returned a republican majority, went overwhelmingly democratic. The repeal of the Edwards law followed and the problem now confronting the Legislature is the enactment of such a law as shall provide educational facilities for the youth of the State and be acceptable to all parties and denominations. The constitutional amendment, passed in 1886, forbidding convict contract labor, which had been ignored by the former administration, was another of the issues upon which the democrats were returned to power. It has been decided to cancel all existing contracts as illegal. On the first day of December, 1892, there were confined in the Joliet penitentiary 1,434 convicts; in the Chester penitentiary 613 convicts, and the reform school had 339 on that date. The question recurs: How can these prisoners be employed at remunerative labor without that labor coming into competition with the free labor of the State. To the solution of this question legislative efforts will be addressed.

Urgent necessity has been felt for the passage of some law restricting the amount of daily labor which may be exacted of women and children, and governing the construction and inspection of the buildings wherein they are employed. For this purpose, a board was created and commissioned by the State to investigate the so-called "sweating system," which had assumed conspicuous proportions in the cloak and clothing trade of Chicago. The facts in regard to the character, the extent, and the effects of this method of employing men and women, have been obtained by a thorough canvass of the districts where it prevails, and they will afford an intelligent basis for any legislative action which the circumstances may demand.

The character of what was once fondly termed "the Prairie State" has been gradually changing. From a comparatively sparse and thinly-populated territory, Illinois has developed into one of the best cultivated States in the Union. Well-tilled and prosperous farms have replaced the wide reaches of open country which in former years gained the State its title. Populous cities have sprung up and teeming millions contribute to her material prosperity. What the future destiny of this great commonwealth will be, when, with the completion of the drainage and ship canal, she will have gained connection with the Gulf, it is impossible to conjecture. That it will usher in a period of even increased prosperity, there is little room for doubt.

ILMENIUM, a name given by R. Hermann to an element which he supposed to be present in ore found in the Ilmen mountains in Siberia; he also supposed it to be present in some other minerals. His conclusions have not been admitted by other chemists.

ILMINSTER, an ancient market-town of Somersetshire, England, on the river Isle, eleven miles southeast of Taunton. The church in Ilminster is a noble example of perpendicular architecture. Some manufactures of ropes, bricks and tiles are carried on. Population of parish (1881), 3,281.

ILSLEY, EAST, or MARKET ILSLEY, a market-town of Berkshire, England, situated amid bleak downs, nine miles north of Newbury and six and a half miles south of Didcot. Its sheep markets are among the most important in the kingdom. Population, 577. Archbishop de Dominis (see Britannica, Vol. VII, p. 355) was rector of West Ilsley, two miles northwest. Population, 377.

IMITATION: in the science of musical composition, the repeating of the same passage, or the following of a passage with a similar one, in one or more of the other parts or voices, and it may be

either strict or free. When the imitated passage is repeated note for note, and every interval is the same, it is called strict, and it may take place in the unison or octave, or in any other of the degrees of the scale, either above or below the original passage. Canon (see Britannica, Vol. XVII, p. 82) is strict imitation carried on to some length. The progression of a passage may also be imitated by an inversion, or by reversing the movement of the original, also by notes of a greater or of a lesser value.

IMMIGRATION INTO THE UNITED STATES OF AMERICA. For general article on this subject see EMIGRATION, Britannica, Vol. VIII, pp. 173-177; and UNITED STATES, Vol. XXIII, pp. 781, 783-821. The official returns made to the commissioners of immigration at the office of the superintendent up to June, 1891, furnish the data for the following figures:

The nationality of immigrants to the United States for the year ending June 30, 1890, was as follows: Germans, 92,427; English, 57,020; Irish, 53,024; Italians, 52,003; Swedes, 29,632; Scotch, 12,041; Norwegians, 11,370; Danes, 9,366; Swiss, 6,993; French, 6,585; Europe, not specified, 112,764; total—Europe, 443,225; all others, 12,077. Of the whole number of immigrants who arrived within the above-named period, 364,086 came through the customs district of New York, 27,178 through Baltimore, 29,813 through Boston, 22,658 through Philadelphia, and 11,567 through all others.

The reported occupations of immigrants who arrived during the year ending June 30, 1889, were as follows: Laborers, 110,809; farmers, 28,962; servants, 30,220; carpenters, 4,373; miners, 5,505; clerks, 4,005; tailors, 3,809; shoemakers, 2,065; blacksmiths, 2,185. The total number of professional immigrants was 2,815; of skilled laborers, 50,457; of miscellaneous, 182,394.

The following are the yearly official summaries since and including 1820:

Year.	Total Immigrants.	Year.	Total Immigrants.
1820.....	8,385	1858.....	119,501
1821.....	9,127	1859.....	118,616
1822.....	6,911	1860.....	150,237
1823.....	6,354	1861.....	89,724
1824.....	7,912	1862.....	89,007
1825.....	10,199	1863.....	174,524
1826.....	10,837	1864.....	193,195
1827.....	18,875	1865.....	247,453
1828.....	27,382	1866.....	163,594
1829.....	22,520	Fiscal year ending June 30.	
1830.....	23,322	1867.....	298,967
1831.....	22,653	1868.....	282,189
1832.....	60,488	1869.....	352,569
1833.....	58,640	1870.....	387,203
1834.....	65,305	1871.....	321,350
1835.....	45,374	1872.....	404,806
1836.....	76,242	1873.....	459,903
1837.....	79,340	1874.....	313,339
1838.....	38,914	1875.....	227,496
1839.....	68,069	1876.....	169,984
1840.....	84,066	1877.....	141,857
1841.....	80,289	1878.....	138,168
1842.....	104,555	1879.....	177,826
1843.....	62,496	1880.....	457,257
1844.....	78,615	1881.....	669,431
1845.....	114,371	1882.....	788,992
1846.....	154,416	1883.....	683,328
1847.....	234,968	1884.....	518,592
1848.....	226,527	1885.....	385,546
1849.....	297,024	1886.....	334,203
1850.....	369,986	1887.....	490,109
1851.....	379,466	1888.....	546,889
1852.....	371,603	1889.....	444,427
1853.....	368,645	1890.....	455,302
1854.....	427,833		
1855.....	200,877	Total.....	15,381,009
1856.....	195,857	From 1789 to 1820, estimated.....	250,000
1857.....	246,945		

In the above table immigrants from the British North American Possessions and Mexico are not included since July 1, 1885.

With regard to insane persons, the new immigration law says that "all idiots, insane persons, paupers, or persons likely to become a public charge, shall be excluded from admission into the United States." This provision is a reenactment of the law of Aug. 3, 1882, which provided that "no convict, lunatic, idiot, nor any person unable to take care of himself or herself, without becoming a public charge, shall be permitted to land."

Now, there is ample proof that since 1882 hundreds of persons have gained admission who ought to have been excluded according to the last-mentioned act. They were shipped to this country from Europe by the authorities of cities and towns, or by so-called benevolent societies. By the same agencies convicts have also been sent to us. A convicted murderer, Nicholas Bader, arrived at the port of New York on April 23, 1891, having been shipped to America by the authorities of a town in Germany, where he had been confined in prison for one year and in an asylum for the insane for 24 years. This case is now under the consideration of the Treasury Department. In a similar way European city and town authorities have for years unloaded paupers and lunatics upon the taxpayers of this country, and especially upon those of the State of New York. In Austria, many persons convicted of crime have been given the alternative of either going to prison or emigrating to America.

Since 1884 the Board of Charities of the State of New York has sent back to Europe more than 600 lunatics, imbeciles, and feeble-minded persons who had been shipped to America by the authorities of their native cities or towns, by immigration societies, and "benevolent" organizations, often also by relatives, guardians, and friends. Two-thirds of these persons entered the State by way of the port of New York. They were afterwards found in the asylums, hospitals, and almshouses of the State. In many cases they had come with through tickets to interior towns, where they at once became public charges. In many instances the senders of such persons even selected the asylum or almshouse in this State to which they should be consigned. Of the 600 persons sent back to their homes in Europe there was no complaint made in any single instance by the authorities into whose charge they fell after their return home. This shows that the action of the Board of Charities had been proper and justified.

According to official statements the number of insane persons in the institutions of the State of New York were on Oct. 1, 1880, 9,537, and on Oct. 1, 1890, 16,022. This is an increase of 6,485 persons in 10 years, or 68 per cent. In the same 10 years the increase of the population of the State was only 18 per cent. It is therefore the belief of the Board of Charities—that this belief is based upon close inquiries—that by far the greater part of this increase is due to the shipment of insane persons to this State from the countries of Europe.

No attempt to enforce the law of 1882 on the Canadian boundary has been made, nor was it effectively enforced at the seaports. But there is a commendable energy shown to enforce the new law at the seaports, and especially at the port of New York, where the evasion of the former law has imposed so heavy a burden on the taxpayers and Board of Charities. In view of the bearing the new Congressional act has upon the general question of immigration, as well as in view of the relief which it promises to bring to the country from the perils incident to indiscriminate and unrestricted immigration, we make room for full text of the act which is as follows:

AN ACT in amendment to the various acts relative to immigration and the importation of aliens under contract or agreement to perform labor.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled, That the following classes of aliens shall be excluded from admission into the United States, in accordance with the existing acts regulating immigration, other than those concerning Chinese laborers: All idiots, insane persons, paupers or persons likely to become a public charge, persons suffering from a loathsome or a dangerous contagious disease, persons who have been convicted of a felony or other infamous crime or misdemeanor involving moral turpitude, polygamists, and every person whose ticket or passagage paid for with the money of another or who is assisted by others to come, unless it is affirmatively and satisfactorily shown on special inquiry that such person does not belong to one of the foregoing excluded classes, or to the class of contract laborers excluded by the act of February twenty-sixth, eighteen hundred and eighty-five; but this section shall not be held to exclude persons living in the United States from sending for a relative or friend who is not of the excluded classes under such regulations as the Secretary of the Treasury may prescribe: *Provided,* That nothing in this act shall be construed to apply to or exclude persons convicted of a political offense, notwithstanding said political offense may be designated as a "felony or other infamous crime or misdemeanor involving moral turpitude" by the laws of the land where he came or by the court convicting.

SEC. 2. That no suit or proceeding for violation of said act of February twenty-sixth, eighteen hundred and eighty-five, prohibiting the importation and migration of foreigners under contract or agreement to perform labor, shall be settled, compromised, or discontinued without the consent of the court entered of record with reasons therefor.

SEC. 3. That it shall be deemed a violation of said act of February twenty-sixth, eighteen hundred and eighty-five, to assist or encourage the importation or immigration of any alien by promise of employment through advertisements printed and published in any foreign country; and any alien coming to this country in consequence of such an advertisement shall be treated as coming under a contract as contemplated by such act; and the penalties by said act imposed shall be applicable in such a case: *Provided,* This section shall not apply to States and immigration bureaus of States advertising the inducements they offer for immigration to such States.

SEC. 4. That no steamship or transportation company or owners of vessels shall directly, or through agents, either by writing, printing, or oral representations solicit, invite or encourage the immigration of any alien into the United States except by ordinary commercial letters, circulars, advertisements, or oral representations, stating the sailings of their vessels and the terms and facilities of transportation therein; and for a violation of this provision any such steamship or transportation company, and any such owners of vessels, and the agents by them employed, shall be subjected to the penalties imposed by the third section of said act of February twenty-sixth, eighteen hundred and eighty-five, for violations of the provision of the first section of said act.

SEC. 5. That section five of said act of February twenty-sixth, eighteen hundred and eighty-five, shall be, and hereby is, amended by adding to the second proviso in said section the words "nor to ministers of any religious denomination, nor persons belonging to any recognized profession; nor professors for colleges and seminaries," and by excluding from the second proviso of said section the words "or any relative or personal friend."

SEC. 6. That any person who shall bring into or land in the United States by vessel or otherwise, or who shall aid to bring into or land in the United States by vessel or otherwise, any alien not lawfully entitled to enter the United States, shall be deemed guilty of a misdemeanor, and shall, on conviction, be punished by a fine not exceeding one thousand dollars, or by imprisonment for a term not exceeding one year, or by both such fine and imprisonment.

SEC. 7. That the office of superintendent of immigration is hereby created and established, and the President, by and with the advice and consent of the Senate, is authorized and directed to appoint such officer, whose salary shall be four thousand dollars per annum, payable monthly. The superintendent of immigration shall be an officer in the Treasury Department, under the control and supervision of the Secretary of the Treasury, to whom he shall make annual reports in writing of the transactions of his office, together with such special reports, in writing, as the Secretary of the Treasury shall require. The Secretary shall provide the superintendent with a suitable furnished office in the city of Washington, and with such books of record and facilities for the discharge of the duties of his office as may be necessary. He shall have a chief clerk, at a salary of two thousand dollars per annum, and two first-class clerks.

SEC. 8. That upon the arrival by water at any place within the United States of any alien immigrants it shall be the duty of the commanding officer and the agents of the steam or sailing vessel by which they came to report the name, nationality, last residence, and destination of every such alien, before any of them are landed, to the proper inspection officers who shall thereupon go or send competent assistants on board such vessels and there inspect all such aliens, or the inspection officers may order a temporary removal of

NOTES ON THE CHART BY REV. A. W. HEWES.—Periodicity.—The culminating years of the past decade are 1882 and 1888, as indicated in the diagram by the general trend of the charting lines.

The chief causes producing fluctuations in the stream of immigration are undoubtedly the comparative conditions affecting labor in this country and that from which the immigrant comes, and it is remarkable that a knowledge of favorable or unfavorable conditions becomes so quickly and generally known in the laboring communities of the Old World, from which the mass of immigration flows.

Look at the chart and see how true it is that the principal European countries reduced their exodus very greatly in 1888. The two exceptions are Italy and Hungary, and in the following year Hungary and Russia. What else than the letters to friends in the old country can give the impulse that increases or decreases this living tide? How these chart lines portray the judgment of foreign peoples as passed upon labor conditions here!

At the same time these chart lines serve to compare the various labor conditions of Europe. Since 1883 the Russian line shows a constant increase, indicating that, whatever the contemplating immigrants from other countries may have believed to be to their advantage or disadvantage, those in Russia have seen advantage only, and have continued to come in undiminished numbers to a country which they believed would give them better conditions. The year 1890 furnishes two other examples of the same kind; for while most countries decreased their contribution to our population, Italy and Hungary greatly increased theirs.

Increase.—It needs but a brief study of the chart lines to see that the three countries which are at present most persistent in their increase are the three just noted: viz., Italy, Russia and Hungary. They send clerks, miners, carpenters and joiners, and tailors.

Of the unskilled or "miscellaneous" occupations 38 are reported, ranging from three "bird dealers" to 139,365 laborers. Others reporting at over 2,000 each are: 3,437 peddlers, 6,707 merchants, 484 teachers, 23,625 servants (of which number Ireland sends 10,118), and 23,296 farmers (of which number Germany sends 8,469).

Among the more numerous "professional occupations" are reported 491 clergymen, 578 musicians, 261 physicians and surgeons, 484 teachers, 109 sculptors, 158 lawyers, 105 engravers, 271 artists, 169 actors, and (the least number) 5 linguists.

One of the surprises coming to many who examine the chart will be the discovery that England alone (not even including Wales) has, since 1885, sent a larger number of immigrants than Ireland.

A few points showing what occupations these two nationalities bring with them are given:

Country.	Total Skilled.	Carpenters and Joiners.	Clerks.	Engineers.	Masons.	Mechanics and Artisans.	Miners.
England.....	10,189	598	1,142	509	621	964	1,143
Ireland.....	2,524	179	428	45	153	300	192

Country.	Total Professional.	Teachers.	Physicians.	Clergymen.
England.	958	152	83	160
Ireland..	184	32	22	78

Country.	Total Miscellaneous (unskilled).	Farmers.	Laborers.	Merchants, Dealers.	Servants.
England.....	15,719	2,452	10,563	1,207	3,042
Ireland.....	30,436	1,525	18,194	229	10,118

Chinese.—The act excluding them became effective August 6, 1882. Between June 30, 1882 (the beginning of the fiscal year 1883), and August 6, 6,613 of the 8,031 landed on our shores. Since 1883 their record ranges from 10 in 1887, to 279 in 1884, but in 1890 jumps to 1,716, of which 1,221 reported as merchants. Italian line has almost met the Irish line. The Russian above both the Norwegian and Scotch.

Germans.—As stated in the title of the chart, the German line is not shown, because it would require such a great increase in height of the diagram. The German average for the decade has been (in round numbers) 145,000 (double that of either English or Irish), while in 1882 the number was 250,630, and in 1886 it was 84,403. Like the records of other desirable immigrants, that of the Germans has since 1883 shown a decrease, the figures beginning with 1888 being 103,717, 92,533 and 92,427.

Italians.—The total Italian immigration for the five years 1876-80 was 23,270; for the five years 1881-85 it was 109,320; and for the five years 1886-90 it was 196,549. These figures refer to the continental immigration alone which the chart line portrays. The insular (Sicily and Sardinia) for the three periods named was 420, 184, and 1,256 or 1,869, for the whole fifteen years, of which 1,146 came in the three years 1888-90. (If this insular immigration were added to the continental it would not move the chart line a hair's breadth except in 1888-90, and in those years its movement would be almost imperceptible.)

Hungarians.—Previous to 1880 less than 1,000 per year.

Swedes.—Previous to 1879 about 5,000 annually.

Occupations.—Of the total immigration of 1890 (455,302), 194,658 had no occupation, 44,540 were skilled operators, 211,756 unskilled or "miscellaneous," 3,236 were reported as having "professional occupations," and 1,117 as "occupation not stated."

The Official Report specifies 102 skilled industries. The number belonging to each of these industries ranges from 3 "iron puddlers" to 3,879 "tailors." The eight reporting over 2,000 each are, in numerical order.

IMMIGRATION STATISTICS. The total arrival of immigrants in the United States from foreign countries, other than British North America and Mexico, during the year ending June 30, 1891, amounted to 560,319, against 455,302 during the preceding fiscal year, an increase of 105,017. The following table shows the number and nationalities of immigrants arrived in the United States during the years ending June 30, 1890 and 1891:

Country of Last Permanent Residence or Citizenship.	1890	1891	Increase.	Decrease.
England.....	57,020	53,600	.....	3,420
Ireland.....	53,024	55,706	2,682	.....
Scotland.....	12,041	12,357	516	.....
Great Britain, other...	669	448	.....	221
Total Great Britain and Ireland.....	122,754	122,311	.....	443
Germany.....	92,427	113,554	21,127	.....
Italy.....	62,003	76,055	14,052	.....
Russia and Poland.....	46,671	74,923	28,252	.....
Austria-Hungary.....	56,199	71,042	14,843	.....
Sweden and Norway.....	41,002	49,448	8,446	.....
Other Europe.....	82,169	36,652	.....	45,517
China.....	1,716	2,836	1,120	.....
All other countries.....	10,361	13,498	.....	6,773
Total.....	455,302	560,319	105,017	.....

Including tourists and immigrants there was an increase in arrivals of 94,376, or more than 22 per cent. over the previous year. The arrivals during the first four months of the present fiscal year (ending Oct. 31, 1891) have been 189,778, an excess of 40,595, or of more than 27 per cent. over the corresponding months of 1890. This extraordinary and progressing increase in the tide of alien immigration to the United States, which does not include the increased arrivals via Canada, has not failed to attract the attention of the whole country, and it will doubtless command the early consideration of Congress.

IMPROVISATORS, poets who, without previous preparation, compose on a given theme, and who sometimes sing and accompany the voice with a musical instrument. The talent of improvisation is found in races in which the imagination is more than usually alert, as among the ancient Greeks, the Arabs and in many tribes of negroes. Down to the present day the performances of improvisators constitute a favorite entertainment of the Italians. Women have frequently exhibited this talent in a high degree.

IMPUTATION, a common technical expression in Christian theology. It denotes the transference of guilt or of merit, of punishment or reward. The doctrine of the imputation of sin, for example, is that all mankind are sharers in the fact and consequences of Adam's fall from innocence, and the correlative doctrine of the imputation of Christ's righteousness is that the merit or righteousness of Christ is transferred to those who believe in Him; in other words, that they become sharers in His righteousness.

IN ARTICULO MORTIS (at the moment of death), a legal phrase used in connection with the execution of deeds by persons at the point of death.

INCARNATION, a term used in theology to denote the union of the Divine nature of the Son of God with human nature in the person of Christ. See **JESUS CHRIST** in these Revisions and Additions; also *Britannica*, Vol. VIII, pp. 656-672.

INCLINED PLANE, *THE*, is reckoned one of the mechanical powers because a man may, by rolling it up a plane, raise a weight, which he could not lift. The figure ABD represents an inclined plane, AD is the plane properly so called; DB the height of the plane, BA its base, and BAD the angle of inclination or elevation. The power necessary to sustain any weight on an inclined plane is to the weight as the height of the plane to its length; or as DB to DA. Hence a force which would, if applied



vertically, just lift 300 pounds will keep a rolling mass of 780 pounds in position upon a smooth inclined plane, whose *gradient* is five (height) in thirteen (sloping length); and a force exceeding this would pull the mass up the slope. In every practical case, however, there is a certain force expended in overcoming friction, even on a dead level; in railway trains this is equivalent to vertically lifting about 50 pounds for every ton of dead weight; and when a train leaves a level run to go up a slope of, say, one in eighty, the engine has for every ton of weight to do work equivalent to vertically lifting fifty pounds plus one-eightieth of a ton, or seventy-eight pounds instead of the former fifty.

IN CŒNA DOMINI, a celebrated papal bull, which dates back to the Middle Ages.

INCORRIGIBLES, that class of persons who, notwithstanding correction, persist in the commission of crimes against society of greater or less magnitude. The term is also applied to common rogues and vagabonds and to refractory inmates of penal institutions. Special laws have been passed in several states of the Union denominated habitual criminal acts, under which lengthy terms of punishment are meted out to old-time offenders. The effectiveness of these laws has been greatly enhanced by the Bertillon system of identification.

INCOME TAX, a tax levied in some countries on income. During and following the civil war, the United States Government levied (from 1861 to 1872) a tax on incomes at the following rates: Dating in 1862, incomes under \$5,000 a year the tax was 5 per cent. (exempting \$600 and paid house-rent); on incomes of \$5,000 and not over \$10,000, 7½ per cent. and on those over \$10,000, 10 per cent. without exemptions. There were several modifications: in 1865 the exemption limit was fixed at \$1,000, and in 1870 at \$2,000. In 1872 the income tax in the United States was abolished. In the United Kingdom the

rate of income tax in 1890 and 1891 was rated as follows:

	In the £
Schedule A, lands, tenements, etc.....	0 0 6
Schedule B, occupiers of farms, etc.....	0 0 8
" Scotland and Ireland.....	0 0 2½
" Nurseries and market gardens.....	0 0 6
Schedules C, D, and E, income.....	0 0 6
If under £150, exempt; if under £400, the tax is not chargeable upon the first £120.	

INCUMBENT, the rector, parson, or vicar holding an ecclesiastical benefice.

INDEBTEDNESS OF FOREIGN NATIONS.

The figures and facts here given (and designed to present a comparative view of the indebtedness of nations in 1890), have been compiled from the detailed statements and reports furnished by the proper financial officers of the United States, as collated and published in the census bulletins of 1890. No special report from Spain and Mexico, and from some of the Southern States had been received up to the date of sending these pages to press. In some cases where an increase of the indebtedness of a nation is shown, such increase is due to aid given to private corporations, or the direct expenditures in the constructions of railways or other public improvements, the value of which improvements may be equal to that of the expenditures therefor, or perhaps in excess, but of which no account can well be taken in a summary of this character. (See table on following page.)

To show changes in the debt in any country between the two periods in question it has been found necessary to adopt a like standard of value for each period, and for that purpose a nominal value in gold of the currency in which the debt was stated, has been used whenever known. Owing to the delay in making up the accounts some of the debts reported for 1890 were, in fact, for 1889, and in a few cases for 1888; but in every case the latest date for which a report of the debt has been received has been taken. See **UNITED STATES, DEBT OF**, in these Revisions and Additions.

INDENTURE, the technical name for a deed, under seal, entered into between two or more parties with mutual covenants. The edges were formerly indented, or notched, to correspond, for identification and security. *Indentures of apprenticeship* refer to the contract between an apprentice and a master.

INDEPENDENCE, a city and county-seat of Buchanan county, Iowa, on Wapsipinicon River, 65 miles west of Dubuque. It has a State insane asylum, three parks, expensive school-buildings. Population in 1890, 4,120.

INDEPENDENCE, the county-seat of Montgomery county, Kan., located on the Verdigris River, 134 miles, by rail, south of Lawrence. Pop. 3,127.

INDEPENDENCE, a city and county-seat of Jackson county, Mo., 10 miles east of Kansas City, and three miles from the Mississippi. It contains two colleges and several other institutions of learning. It was formerly the headquarters of the overland routes to New Mexico, Oregon and California. Population in 1890, 6,373.

INDIA. For general article on this great British empire, giving *in extenso* its geography, history, government, productions, commerce and earlier statistics, see *Britannica*, Vol. XII, pp. 731-812. The present area of the empire, without reckoning in Baluchistan (130,000 square miles), which is to some extent dependent on, or feudatory to, India, reaches from the 8th to the 35th degree of north latitude, and from the 67th to the 100th degree of longitude east of Greenwich; Calcutta itself lying in 88° E. longitude. The areas of Cashmere, Manipur, and of the recently annexed province of Up-

Names of Countries.	Debt Less Sinking Fund.		Debt Per Capita.	
	1880.	1890.	1880.	1890.
Argentina Republic.....	\$117,165,852	\$284,867,069	\$67.46	\$70.40
Austria-Hungary.....	2,224,509,572	2,866,339,639	58.72	70.84
Belgium.....	272,349,276	380,504,099	49.32	63.13
Bolivia.....	29,100,000	14,763,367	14.87	12.38
Brazil.....	445,225,934	585,345,927	44.83	41.80
Chili.....	85,762,665	85,192,339	37.56	31.96
Colombia.....	14,706,679	68,451,588	3.79	16.36
Denmark.....	27,618,982	83,004,722	13.95	15.66
France.....	4,274,782,478	4,446,793,898	113.47	116.35
Dependencies—Africa:				
Madagascar.....		2,827,900		0.81
Tunis.....	25,000,000	84,881,500	12.33	23.25
German Empire (proper).....		77,577,719		1.57
States of Germany:				
Alsace-Lorraine.....	3,937,265	3,837,373	2.51	2.39
Baden.....	67,953,404	71,165,252	43.28	42.95
Bavaria.....	283,664,534	335,503,105	53.63	60.03
Bremen.....	5,459,025	16,217,400	34.33	89.94
Brunswick.....	6,507,856	4,876,174	18.63	12.10
Hamburg.....	84,384,003	59,202,946	75.78	94.85
Hesse.....	6,187,836	7,562,758	6.59	7.69
Lippe.....	340,200	220,725	2.83	1.72
Lübeck.....	3,738,817	3,295,709	58.81	43.10
Mecklenburg-Schwerin.....	10,500,000		18.20	
Mecklenburg-Strelitz.....	57,775		0.58	
Oldenburg.....	9,257,787	9,211,095	27.43	25.95
Prussia.....	844,115,551	1,109,384,127	12.61	37.03
Saxe-Weimar.....	222,162	425,662	0.72	1.31
Saxony.....	152,539,705	143,897,747	51.31	41.11
Schaumburg-Lippe.....	350,000	150,000	9.89	3.83
Thuringian States:				
Reuss, E. B.....	85,650	70,687	1.69	1.13
Reuss, Y. B.....	176,819	63,540	1.74	0.63
Saxe-Altenburg.....	150,968	158,853	0.97	0.99
Saxe-Coburg-Gotha.....	947,340	955,311	4.87	4.68
Saxe-Meiningen.....	2,418,340	2,550,698	11.68	11.39
Schwarzburg-Rudolstadt.....	521,550	743,800	6.50	8.67
Schwarzburg-Sondershausen.....	806,919	842,631	11.35	11.16
Waldeck.....	623,175	568,200	11.03	9.92
Württemberg.....	91,564,500	107,755,500	46.45	52.83
Great Britain and Ireland.....	8,577,746,630	8,550,719,565	101.52	87.79
Dependencies—				
Asia:				
Ceylon.....	1,750,000	11,134,400	0.63	3.86
India.....	671,574,652	881,003,592	2.64	3.27
Africa:				
Cape of Good Hope.....	55,034,660	110,817,720	48.40	77.56
Mauritius.....	3,883,000	8,464,662	10.77	22.92
Natal.....	7,182,180	22,028,424	19.72	45.76
America:				
Bermudas.....		41,864		2.69
Canada.....	175,194,000	337,533,212	40.51	47.51
Australasia and Oceania:				
Fiji.....		678,800		5.41
New South Wales.....	74,519,595	233,289,245	99.17	214.87
New Zealand.....	128,085,565	184,898,305	261.43	298.01
Queensland.....	66,245,430	129,204,750	310.25	333.46
South Australia.....	49,330,000	202,177,500	176.28	321.00
Tasmania.....	8,683,248	22,335,345	75.05	147.46
Victoria.....	102,538,300	179,614,005	118.91	161.56
Western Australia.....	1,692,161	6,509,736	56.96	150.23
Greece.....	51,079,492	107,306,518	25.80	49.06
Guatemala.....	4,241,055	10,825,836	3.46	7.59
Hayti.....	16,223,263	13,500,000	28.56	14.06
Hawaii.....	388,900	2,302,235	6.71	26.57
Honduras.....	29,111,925	63,394,267	116.45	146.77
Italy.....	2,014,237,832	2,324,826,329	76.79	78.06
Japan.....	345,073,805	305,727,816	9.65	7.83
Liberia.....	500,000	972,000	0.69	0.91
Mexico.....	117,193,728	113,606,675	11.83	9.98
Montenegro.....		740,200		3.14
Netherlands.....	389,440,317	480,589,558	95.31	95.56
Dependency—Dutch East Indies.....		18,381,509		0.64
Nicaragua.....		1,711,206		4.28
Paraguay.....	229,392,000	19,633,013	96.42	59.58
Pern.....	265,050,000	382,175,655	98.06	145.77
Roumania.....	74,189,652	180,145,800	14.02	32.75
Russia.....	3,312,953,000	491,018,074	38.55	30.79
Salvador.....	2,078,885	6,013,300	4.78	9.06
Santo Domingo.....	3,682,422	9,845,350	14.73	16.17
Servia.....	7,000,000	60,811,330	4.19	30.20
Spain.....	2,583,209,252	1,261,453,696	155.37	73.85
Sweden and Norway:				
Sweden.....	56,551,435	64,220,807	12.39	13.53
Norway.....	17,543,837	18,973,752	9.65	7.12
Switzerland.....	5,873,399	10,912,925	3.06	5.72
Turkey:				
Dependency—Egypt.....	491,520,600	517,278,300	89.08	75.53
Grand total.....	23,451,572,185	25,636,075,840	34.14	33.36

per Burma, with its dependent Shan States, have never been surveyed. Cashmere, however, is estimated at 80,900 square miles, Manipur at 8,000, Upper Burma at 90,000, and the British Shan States at 90,000. With these estimated figures, the total area of British India may be taken to be 1,648,944 square miles, of which 765,947 square miles are under native and the remainder under British administration. The population of India, shown by the census in 1881, was 253,982,595; but this did not include the figures for Cashmere, which in 1873 had a population of 1,534,972, or Manipur with its population of 221,070, or Upper Burma with its estimated population of 3,000,000, and the Shan states with their estimated population of 2,000,000. Adding in these totals, and allowing for a yearly increment of one-half per cent. to the census figures, the total population of British and feudatory India at the beginning of the year 1891 may be taken to be 273,533,000, of whom 211,936,000 are in British territory. From Peshawar, the northern frontier station, to Cape Comorin, the distance is 1,900 miles, and the same distance separates Kurrachee, the port of Sind, from Sudiya, the frontier post on the eastern border of Assam. The limit, yet undefined, of the states dependent on Upper Burma stretches even further to the east than Sadiya, while British influence in Baluchistan goes farther west than Peshawar. The province of Burma, including the country formerly independent, and now called Upper Burma, which was annexed to the Asiatic dominion early in 1886, lies to the east of the Bay of Bengal, and forms no part of the Indian Peninsula.

The English dominion in India dates from 1600, when the first East India Company was incorporated by Queen Elizabeth. The act establishing the authority of the British crown, and the "Proclamation to Princes, Chiefs, and Peoples of India," that Her Majesty, Queen Victoria, assumed the government of all the territories of India, were dated Nov. 1855. It was not, however, till 1877 that the queen formally assumed the title of Empress of India. The home imperial government is intrusted to a "Secretary of State for India," assisted by a council of not less than ten members, the majority of whom must be persons who have served or resided ten years in India, and who have not left India more than ten years previous to the date of their appointment on the council. The office is held for a term of ten years, and any vacancy is filled by the appointment of the "Secretary of State for India."

British India now (1891) embraces nine separate provinces, each under its own civil government, but subordinate to the general and supreme government. The resident chief executive, the viceroyal governor-general, whose administration extends over all the provinces, is appointed by the crown. His present annual salary is £25,000 (\$125,000), with additional allowance of about £12,000. His ordinary term of office is five years. The present incumbent (July 1, 1891) is the Marquis of Lansdowne, who assumed office Dec. 10, 1888. He is supreme in his executive authority, but is assisted by an executive council of six members, including the commander-in-chief. Power is reserved to him of overruling his council; but all acts of the government run in the name of the "Governor-General in Council." This body, forming the supreme government in India, passes in review the entire administration in six separate departments—Finance and Commerce, Foreign, Military, Public Works, Home, and the Department of Revenue and Agriculture. Each department is under the charge of a secretary, and is also the

special care of a member of the supreme council, who has authority to deal with affairs of routine and minor importance, and to select what is worthy of the consideration of the governor-general and his collective council. The governor-general specially superintends the political business of the foreign office. The department of finance and commerce looks to questions of finance, to stamps, excise; the postoffice, and anything involving a permanent charge on the state; also to questions bearing on the commerce of the country. The most important subjects coming under the attention of the department of revenue and agriculture are the land revenue, forests, and the agricultural development of the country. The home department deals with the educational, medical, sanitary, ecclesiastical, judicial, municipalities, local government boards, police, and other matters, and has charge of the penal settlements of Port Blair and Nicobar. The foreign department conducts relations with Afghanistan, Nepal, and other conterminous countries, and corresponds with the political agents of the numerous semi-independent native states of Rajputana and Central India, and with the residents of Mysore, Cashmere, Baroda, and Hyderabad. The marine service, as well as the army, is under the military department. The legal member takes charge of government bills in the legislative council, which consists of twelve members (besides the seven members of the executive council), of whom one-half must be unconnected with the public service. As only Bengal, Madras, Bombay, and the Northwest Provinces possess councils of their own, the legislative council of India legislates for those provinces which are unprovided with local councils, or on matters of exceptional importance affecting the empire.

Separate high courts have been established for the provinces of Madras and Bombay and for the lieutenant-governorship of Bengal (with jurisdiction also over Assam), and of the Northwest Provinces. The Punjab has a chief court; the Central Provinces, Oudh and Mysore, have each a judicial commissioner, and Burma has a judicial commissioner and a recorder.

The government of India is debited with the cost of the army for all India, with the interest on debt, and, generally, with all imperial as distinguished from provincial expenditure.

Since the close of the record in the Britannica, Vol. XII, the list of governor-generals has been as follows, with date of appointment: Marquis of Ripon, 1880; Marquis of Duferin and Ava, 1884; Marquis of Lansdowne, 1888.

The native states of India cover an area of 766,000 square miles, and contain an estimated population of 61,000,000. The most important of native Princes in 1891 are mentioned in the following table:

Princes.	Sq. M.	Pop. 1881.	Revenue.
			Rx.*
Nizam of Hyderabad.....	81,807	9,845,594	3,130,000
Gaekwar of Baroda.....	8,570	2,185,005	1,523,000
Maharaja of Gwalior.....	29,067	3,115,857	1,434,000
" of Mysore.....	24,723	4,180,168	1,329,000
" of Cashmere.....	80,000	1,534,972†	700,000
" of Travencore.....	6,730	2,311,379	712,000
" of Jaipur.....	14,465	2,534,357	620,000
" of Indore.....	8,402	1,065,217	611,000
" of Patiala.....	5,887	1,467,433	479,000
" of Jodhpur.....	37,000	1,750,403	408,000
Begum of Bhopal.....	6,874	954,901	351,000
Takur Sahab of Bhawnagar....	2,860	400,333	435,000
Raja of Kolhar.....	2,816	500,189	310,000
Maharaja of Bhurtpur.....	1,974	645,450	261,000
" of Ulwar.....	3,024	682,926	207,000
" of Oudipur.....	12,670	1,494,220	258,000

* Rx. = 10 rupees, or about \$5.

The names of the various provinces, as arranged at present, with their population, as reported at latest dates, are as follows:

Provinces.	Population 1881.	Chief City.	Population.	Lt. Governor's Salary.
(1) Bengal.....	66,691,656	Calcutta	433,219	Ex. 8,333
(2) Northwest Provinces and Oude	44,107,849	Allahabad	148,547	8,333
(3) The Punjab.....	18,850,427	Lucknow*	261,863	8,333
(4) Central Provinces.....	9,938,791	Nagpur	119,263	4,066
(5) Burma (Upper and Lower).....	8,736,771	Mandalay	150,000	6,066
(6) Assam.....	4,888,226	Rangoon	134,176	4,106
(7) Madras.....	30,638,549	Gauhati	11,695	10,000
(8) Bombay.....	16,482,724	Sylhet	14,700	10,000
(9) Berar.....	2,672,673	Adra	465,848	10,000
		Ellichpore	73,126	
			2,728	

* Chief city of Oude.

The present Nizam of Hyderabad was installed in 1884. Cashmere was granted to Gholab Sing by Lord Hardinge, after the First Punjab War. His son and successor, Rumbir Sing, died on September 12, 1885, and was succeeded by the present Maharaja, Pertab Sing, when also a British Resident was appointed, and stronger pressure was brought to bear in favor of much needed reforms in the government. In 1889, in consequence of continued misgovernment, the Maharaja was deprived of his powers, which were intrusted to a native council, assisted by the advice of the resident.

The most important recent act of the Indian legislation was a comprehensive act, passed in 1890, dealing with railways in that empire. Other acts dealt with probate and administration in India, with the law relating to guardians and wards, with Indian cantonments, with the forests of Burma, and with tenant right, land revenue, sanitation, and local self-government in the Central Provinces. Legislation was also passed to make penal the disclosure of official secrets, to prevent cruelty to animals, to raise the duty on imported spirits and to tax Indian-brewed beer, and, lastly, to indemnify certain witnesses who had incriminated themselves, on the promise of indemnity, at the trial of a high government official in Bombay.

In the year 1889-1890, the foreign trade of India increased beyond the totals of the previous year. During that year, excluding government merchan-

dise and treasure valued at Rs. 2,76,55,061, the foreign seaborne trade of British India (excluding Aden and its dependencies, of which the trade may be stated at about 7½ million tens of rupees) amounted to Rs. 1,89,25,82,000, or 5½ per cent. above the total of 1888-89; of this amount Rs. 84,01,94,000 represent imports and the remainder exports. The imports of treasure increased to Rs. 17,46 lacs, and the exports to 1,90½ lacs.

All imports are free, excepting arms and ammunition, opium, liquors, petroleum oil, and salt. An excise tax on Indian-brewed beer is under consideration. The duty on petroleum oil of 6 pies per imperial gallon was introduced in 1888, and in 1889-90 realized nearly 16¼ lacs. Notwithstanding the duty there has continued to be a large increase in the imports of oil, especially from Russia. The value of Indian cotton yarn and piece goods exported has increased from 74 lacs in 1876 to 674½ in 1889-90. Each year sees a large extension of this industry. Having wrested the markets of China and Japan to a large extent from England, the Bombay mill-owners are now successfully competing for the market of Eastern Africa, of Aden, of Ceylon, and of the Straits Settlements.

The following table gives the populations, with the religious census of the principal cities of India as reported in the census of 1881:

Census 1881.	Hindus.	Mahomedans.	Christians.	Others.	Total.
Bombay City and Island.....	503,780	158,694	42,389	69,383	773,196
Calcutta.....	278,762	124,430	30,027	438,219	881,438
Madras.....	307,330	120,212	5,587	333,079	766,128
Hyderabad and Suburbs.....	316,527	50,298	39,682	405,848	811,355
Lucknow.....	155,230	99,153	6,253	354,962	615,598
Bombay.....	131,334	47,234	1,130	199,705	379,403
Delhi.....	35,184	72,519	2	173,893	351,598
Patna.....	127,076	43,086	492	170,654	341,264
Amritsar.....	109,036	46,579	1,515	160,203	317,333
Calcutta.....	112,257	34,521	13	155,837	302,628
Amritsar.....	61,274	75,891	3,194	151,444	391,599
Amritsar.....	53,641	86,413	9,315	149,689	399,458
Amritsar.....	99,518	43,558	5,207	214	148,517
Amritsar.....	100,850	32,951	8,777	142,578	244,156
Amritsar.....	35,871	21,169	67,395	9,741	134,176
Amritsar.....	103,348	16,574	3,645	139,751	263,318

INDIAN AFFAIRS IN THE UNITED STATES. For the general article on the American Indians, including the history and earlier statistics of the various tribes, brought down to a recent date, see Britannica, Vol. XII, pp. 822-835. In these Revi-

sions and Additions it is only required that such facts and figures shall be given as are needed to furnish the latest important information. This information has been drawn chiefly from the elaborate annual report of the Hon. T. J. Morgan, Commissioner of Indian Affairs, made to the United States Secretary of the Interior, under date of October, 1890, and from the Official Census Reports of the United States for the year 1890.

I. SUPERVISION OF INDIAN AFFAIRS.—The law prescribes that the Commissioner "shall, under the direction of the Secretary of the Interior, and agreeably to such regulations as the President may prescribe, have the management of all Indian affairs, and of all matters arising out of Indian relations." He is charged with the annual disbursement of more than \$7,000,000 and with the purchase and distribution of great quantities of subsistence, clothing, agricultural, medical, and other supplies. He gives instructions to more than sixty agents, supervises their work, examines their accounts, decides perplexing questions arising constantly in the course of administration of agency affairs, and through them oversees in detail the various lines of civilization inaugurated among the tribes, farming, stock-raising, building of houses, Indian police and courts, social and sanitary regulations, etc. He determines upon the appointment and removal of over twenty-five hundred agency and school employes, and appoints traders and physicians. Licensed trade among Indians is under his exclusive control.

He considers and determines all questions of law arising in reference to Indian lands; the legal status of Indians with reference to each other and to white people; the conflicts between local or State laws and tribal customs, and between State and Federal laws; also questions of citizenship, guardianship, crimes, misdemeanors; the prosecution of persons for the sale of whisky to Indians; taxation; water rights; right of way of railroads; cattle grazing; conveyances of land; contracts between Indians and whites; sales of timber on Indian reservations; allotment of land, etc. Many of these questions, especially those relating to lands, are of great intricacy, involving interpretations of treaties and laws as far back as colonial times.

He is charged with the duty of organizing a plan of education with all which that implies; the erecting of schoolhouses; appointing of teachers, and the keeping of a watchful oversight over all Indian school matters.

Bills relating to Indian affairs are usually referred by Congress to the Indian Bureau for information and report, and before signing an act the President generally refers it to the Commissioner for report as to the existence of any reason why it should not receive Executive approval. Original bills and reports are also prepared by the Indian Office for transmission to Congress.

Under the act of March 3, 1885, the Commissioner examines and reports to the Secretary of the Interior on all depredation claims, amounting to many millions of dollars, which have been filed in the Bureau during the last forty years.

II. AREA AND POPULATION OF INDIAN TERRITORY BY STATES.—At the date of the Commissioner's annual report in 1889 there were 133 Indian reservations in the United States (counting the 22 small reserves of the Mission Indians of California as one only, and the 19 Pueblo reserves in New Mexico also as one), having an aggregate area of about 116,000,000 acres, or 181,250 square miles, an area greater than that of the New England and Middle States combined, greater than the aggregate area of

the States of Ohio, Indiana, Illinois, and Kentucky, and nearly equal to the combined area of the two Dakotas and Montana. It is larger by half than the United Kingdom of Great Britain and Ireland, larger than Sweden or Norway, and nearly as large as either France or Spain. The total Indian population of the United States, *exclusive of Alaska*, was, by the census of 1889, 250,483, and *exclusive of the five civilized tribes in Indian Territory*, 185,283.

The following table shows the distribution of Indian lands and Indian population in the several States and Territories at the date above referred to:

State or Territory.	Area in acres.	Square miles.	Population.
Arizona.....	6,603,191	10,317½	17,779
California.....	494,045	772	12,739
Colorado.....	1,094,400	1,710	1,814
North Dakota.....	3,188,480	4,982	8,252
South Dakota.....	22,910,426	35,798½	21,461
Idaho.....	2,611,481	4,080	4,174
Indian Territory.....	39,189,530	61,249	79,692
Iowa.....	1,258	2	893
Kansas.....	102,026	159½	989
Michigan.....	27,319	42½	7,428
Minnesota.....	4,747,941	7,419	7,979
Montana.....	10,591,360	16,549	11,214
Nebraska.....	136,947	214	3,701
Nevada.....	854,135	1,490½	8,251
New Mexico.....	10,049,525	15,339	28,898
New York.....	37,677	137	5,046
North Carolina.....	65,211	102	3,000
Oregon.....	2,075,240	3,242	4,520
Texas.....	.....	.....	290
Utah.....	3,972,480	6,207	2,294
Washington.....	4,045,284	6,321	9,789
Wisconsin.....	512,061	800	7,503
Wyoming.....	2,942,400	3,660	1,945
Miscellaneous.....	.....	.....	1,302

III. AREA, POPULATION, AND DISBURSEMENTS BY AGENCIES.—The table on page 893 gives the names and State locations of the various Indian Agencies, severally showing the areas and Indian population with the government appropriation to each, with salaries of the agents and the amount of the bonds which the latter were required to execute severally for the fiscal year ending June 30, 1890.

IV. SETTLED GOVERNMENT POLICY.—On this important question the Indian Commissioner says: "It has become the settled policy of the government to break up reservations, destroy tribal relations, settle Indians upon their own homesteads, incorporate them into the national life, and deal with them not as nations or tribes or bands, but as individual citizens. The American Indian is to become the Indian American."

"A public school system is being rapidly provided, whereby every accessible Indian boy and girl of school age is to be afforded an opportunity of acquiring the rudiments of an English education and the elements of an honorable calling. What progress has been made in this direction during the last year is discussed under the general topic of education."

"The Indians themselves are coming to understand the present policy of the Government and are showing an increasing readiness and even desire to adjust themselves to it. During the year I have had personal interviews with prominent chiefs and representative Indians from Wisconsin, North and South Dakota, Oregon, Arizona, New Mexico, Oklahoma, and Indian Territory, and I have been much gratified with their intelligent apprehension of the situation and with the willingness exhibited, as a general thing, to except lands in severalty with individual citizenship. Almost without exception they have pleaded with me for more and better schools."

Agency.	Area in Square Mls.	Population.	Bond.	Amount of Annual Disbursements.	Salary.
Blackfeet, Mont.....	2,750	2,293	\$80,000	\$150,000	\$1,800
Cheyenne River, S. Dak.....	2,481	2,846	20,000	150,000	1,500
Cheyenne and Arapaho, Oklahoma.....	6,715	3,598	80,000	200,000	2,200
Colorado River, Ariz.....	530	979	15,000	20,000	1,500
Colville Agency, Wash.....	5,348	3,701	20,000	30,000	1,500
Crow Creek and Lower Brulé, S. Dak.....	1,185	2,171	25,000	120,000	1,800
Crow, Mont.....	7,304	2,455	25,000	150,000	2,000
Devil's Lake, N. Dak.....	432	2,356	15,000	20,000	1,200
Eastern Cherokee, N. C.....	102	3,000	2,000	None.....	800
Flathead, Mont.....	2,240	1,914	20,000	20,000	1,500
Fort Berthold, N. Dak.....	4,550	1,185	20,000	30,000	1,500
Fort Belknap, Mont.....	2,340	1,193	30,000	115,000	1,500
Fort Hall, Idaho.....	1,878	1,600	20,000	30,000	1,500
Fort Peck, Mont.....	2,775	1,891	40,000	165,000	2,000
Grand Ronde, Oregon.....	96	374	15,000	20,000	1,000
Green Bay, Wis*.....	483	3,350	80,000*	30,000	1,500
Hoopa Valley, Cal.....	180	476	(Army officer.)		
Kiowa, Oklahoma.....	5,801	4,883	30,000	20,000	2,000
Klamath, Oregon.....	1,650	904	10,000	30,000	1,100
Lemhi, Idaho.....	100	524	10,000	20,000	1,000
La Pointe, Wis.....	667	4,713	20,000	25,000	2,000
Mescalero, N. Mex.....	741	474	20,000	35,000	1,800
Mission Tule River (consolidated), Cal.....	432	4,524	25,000	25,000	1,600
Navajo, N. Mex.....	16,741	20,200	20,000	25,000	2,000
Nehalem Bay, Wash.....	36	736	10,000	15,000	1,000
Nevada, Nev.....	1,001	959	10,000	20,000	1,500
New York, N. Y.....	137	5,046	20,000	25,000	1,000
Nez Percés, Idaho.....	1,167	1,450	20,000	25,000	1,600
Omaha and Winnebago, Nebr.....	124	2,347	25,000	40,000	1,600
Osage and Kaw, Oklahoma.....	2,453	1,696	125,000	500,000	1,800
Pima, Ariz.....	775	11,513	10,000	20,000	1,800
Pine Ridge, S. Dak.....	4,930	6,011	50,000	300,000	2,300
Ponca, Pawnee, Otoe and Oakland, Oklahoma.....	803	1,865	30,000	100,000	1,500
Pottawatomie and Great Nemaha, Kans.....	196	989	40,000	75,000	1,000
Pueblo, N. Mex.....	1,417	8,252	10,000	10,000	1,800
Puyallup (consolidated), Wash.....	864	1,844	25,000	40,000	1,600
Quapaw, Ind. T.....	325	1,150	20,000	50,000	1,500
Rouge Valley, Cal.....	159	531	15,000	10,000	1,500
Rosebud, S. Dak.....	5,044	7,586	50,000	400,000	2,200
San Carlos, Ariz.....	3,950	3,940	20,000	100,000	2,000
Southern Ute and Jicarilla, Colo.....	2,360	1,814	25,000	75,000	1,400
Sisseton, S. Dak.....	1,235	1,487	20,000	25,000	1,500
Standing Rock, N. Dak.....	4,176	4,110	50,000	250,000	1,700
Sac and Fox, Oklahoma.....	2,329	2,180	25,000	50,000	1,200
Sac and Fox, Iowa.....	2	393	20,000	20,000	1,000
Santee, Nebr.....	150	1,354	20,000	50,000	1,200
Shoshone, Wyo.....	1,235	1,945	25,000	75,000	1,500
Siletz, Oregon.....	351	606	15,000	20,000	1,200
Tongue River, Mont.....	580	867	15,000	40,000	1,500
Tulalip, Wash.....	25	1,233	10,000	10,000	1,000
Umatilla, Oregon.....	420	983	15,000	20,000	1,200
Union, Ind. T.....	30,914	65,200	50,000	100,000	2,000
Uintah and Ouray, Utah.....	6,207	1,904	40,000	100,000	1,800
Warm Springs, Oregon.....	725	853	15,000	30,000	1,000
White Earth, Minn.....	6,983	6,239	50,000	75,000	1,600
Western Shoshone, Nev.....	458	477	10,000	20,000	1,500
Yakama, Wash.....	1,350	1,675	30,000	30,000	2,000
Yankton, S. Dak.....	672	1,760	20,000	30,000	1,500
Average salary.....					\$1,533.33½

*Agent at Green Bay is required to file a special bond in the sum of \$100,000 to cover logging money.

†At present in charge of Army officer.

"Another fact of significance is the growing recognition on the part of Western people that the Indians of their respective States and Territories are to remain permanently and become absorbed into the population as citizens. While demanding the application of the principle of 'home rule' in the selection of agents and other employees from the State or Territory in which the Indians are located, I think they also recognize the obligations which they thereby assume to recommend only suitable persons for appointment. If the Indians of South Dakota, for instance, are to remain forever within the limits of the State, either as a burden and a menace, or as an intelligent, self-supporting, co-operative factor in State life, no others except the Indians themselves can have so deep an interest in their practical status as to the people by whom they are surrounded.

"There is also a growing popular recognition of the fact that it is the duty of the Government, and of the several states where they are located, to make ample provision for the secular and industrial education of the rising generation, leaving the churches free to prosecute with renewed vigor their legitimate work of establishing and maintaining religious missions. By this harmonious and yet separate activity of the Government and the churches all of the Indians will eventually be brought into right relations with their white neighbors, and be prepared for the privileges and responsibilities of American Christian citizenship."

V. INDIAN TRAINING SCHOOLS. — The United States Indian Department has given much attention to the subject of Indian education and the schools have been visited and inspected with increased care and thoroughness. Large and care-

ful expenditures have been made in repairing and enlarging school-houses and providing them with proper equipments, and new ones have been erected where most urgently demanded. A new and carefully revised system of rules, including a course of study, has been drawn up and a series of textbooks prepared.

Commissioner Morgan in his supplemental report of 1889 set forth quite in detail his views regarding Indian education. These views have met with most gratifying acceptance, and have awakened a great deal of interest among all classes of citizens. The plan there outlined received the indorsement of Dr. W. T. Harris, United States Commissioner of Education, of General John Eaton, ex-Commissioner of Education, and was heartily approved by the National Educational Association, the American Institute of Instruction, the New York State Teachers' Association, and other leading educational bodies, besides receiving the warmest commendation of distinguished educators and philanthropic organizations, like the Mohonk Conference, the Indian Rights Association, etc.

Under the fostering care of the Government, a series of training schools has grown up more or less distant from the reservations where, in addition to the ordinary English education, Indian pupils are trained to habits of industry. The following table shows the list of these schools with their locations, date of opening, capacity, rate per annum, enrollment, and average attendance during the fiscal year ending June 30, 1890.

Location.	Date of Opening.	Capacity.	Rate Per Annum.	Enrollment.	Average Attendance.
Carlisle, Penn.	1879	500	167	789	702
Salem, Ore.	1880	250	175	208	175
Genoa, Neb.	1884	255	175	106	154
Grassell Institute, Kansas	1884	440	175	460	417
Grand Junction, Idaho.	1884	200	175	194	169
Albuquerque, N. M.	1886	60	175	48	38
Albuquerque, N. M.	1886	225	175	222	164
Carson, Neb.	New.	150			
Santa Fe, N. M.	New.	135			
Pierre, S. D.	New.	90			
Fort McDowell, Ariz.	New.	200			
Fort Totten, N. D.	New.	250			

For the fiscal year ending June 30, 1891, Congress made liberal appropriations for these schools which

will enable the office to put them on a broad basis, and thoroughly equip them for their important work. With the improvements now being made they will be able next year to care for not less than thirty-five hundred students.

Already a very considerable number have shown both the desire and ability to pursue higher studies. Several are now successfully teaching, or fitting themselves to teach, others are practicing medicine, some are preaching, and still others are preparing for the practice of law. The desire for these higher studies is steadily increasing and only needs a little fostering to be productive of the best results. A common school, industrial education for all, a liberal and professional education for the worthy few, with a fair field and free competition, is all that is asked for Indians as for others.

The outing system which brings Indian youth into intimate and vital relationship with civilized communities is now readily developing and is productive of the most hopeful results. During the year 1890, Carlisle accommodated nearly 800 pupils, more than half of whom have had the advantage of living and working with Pennsylvania farmers and others. Their work was very satisfactory, and the school was unable to meet the demand made upon it for help. When the present plans for increasing its capacity are completed, not less than 1,000 pupils can be cared for at this one institution. Every Indian boy or girl who secures a place to work at fair wages has become a producer, and is practicably independent and self-supporting.

The superintendent of Haskell Institute wrote to the Commissioner that he expected to be able, when the present plans for that school are completed, to care for 1,000 students, and to provide homes for a large number of them among Kansas farmers.

VI. INDIAN BOARDING AND DAY SCHOOLS.—The subjoined table shows the number of Indian boarding and day schools and average attendance for each year from 1882 to 1890, both inclusive:

Year.	Board'g sch.		Day schools.		Totals.	
	No.	Average attendance.	No.	Average attendance.	No.	Average attendance.
1882.....	71	2,755	54	1,311	125	4,062
1883.....	75	2,599	64	1,443	139	4,046
1884.....	86	4,358	76	1,757	162	6,115
1885.....	114	6,201	86	1,942	200	8,143
1886.....	115	7,260	99	2,370	214	9,630
1887.....	117	8,020	110	2,540	227	10,560
1888.....	126	8,705	107	2,715	233	11,420
1889.....	136	9,146	103	2,406	239	11,552
1890.....	140	9,865	106	2,367	246	12,232

Concerning the question of the education of Indian pupils in the public school wherever practicable, the Commissioner says: "Believing that the true purpose of the Government in its dealings with the Indians is to develop them into self-supporting, self-reliant, intelligent, and patriotic citizens, and believing that the public schools are the most effective means of Americanizing our foreign population, I am desirous of bringing the Indian school system into relation with that of the public schools. Not only so, but wherever possible I am placing Indian pupils in the public schools. Very few are thus far enjoying these advantages, but in a letter addressed to the superintendents of public instruction in the several States and Territories where there are Indians under the care of the

National Government I have invited their co-operation, and have offered to contract with school districts for the tuition of Indian pupils at the rate of \$10 per quarter.

"I think this will prove a very important feature of the work in hand, and confidently expect within a year to be able to report a great advance in this direction. Indian allottees can be provided with educational facilities for their children in no more satisfactory manner, and the tuition paid by the Government aids the school districts to maintain schools in sections of the country where lands in severalty have been taken by the Indians."

The total annual appropriations made by Congress since the year 1876 for the support of Indian schools were as follows:

Year.	Appropriation.	Per cent of increase.
1877.	\$ 20,000	
1878.	30,000	50
1879.	60,000	100
1880.	75,000	25
1881.	75,000	
1882.	135,000	80
1883.	487,200	260
1884.	675,200	38
1885.	992,800	47
1886.	1,100,065	10
1887.	1,211,415	10
1888.	1,179,916	96.6
1889.	1,248,015	14
1890.	1,364,568	01
1891.	1,842,770	35

VII. MEDICAL AND SURGICAL SERVICE.—With the exception of five civilized tribes, all the Indians under governmental control are dependent upon the agency physicians for their services. Their own "medicine men" are ignorant, and often vicious, and their historic superstitious influence over the tribes is comparatively slight. The physicians employed at the agencies are, however, poorly paid as is shown by the following table of physicians' salaries copied from the Commissioner's report for 1890:

No.	Official Designation.	Salary.
1	Agency physician.....	\$1,300
38	do.....	1,200
25	do.....	1,000
2	do.....	900
1	do.....	700
2	do.....	300
2	do.....	200
71	Average salary.....	1,062

No.	Official Designation.	Salary.
4	Physician at Schools.....	\$1,300
2	do.....	1,000
1	do.....	900
2	do.....	500
1	do.....	300
1	do.....	240
11	Average salary.....	813
	Average salary for the entire list.....	1,028
	Total cost for salaries.....	84,300

VIII. APPROPRIATIONS TO RELIGIOUS DENOMINATIONS FOR INDIAN SCHOOL WORK.—The subjoined

table shows the amount set apart by the Government for the various religious denominations for Indian education for each of the fiscal years from and including the year 1886:

	1886.	1887.	1888.	1889.	1890.	1891.
Denominations.						
Roman Catholic.....	\$118,344	\$194,635	\$221,169	\$247,672	\$356,987	\$247,689
Presbyterian.....	32,995	37,910	36,500	41,835	47,650	44,880
Congregational.....	15,121	26,096	26,080	28,310	28,459	27,271
Martinburg, Pa.....	5,400	10,410	7,500	Dropped.		
Episcopal.....		4,175	4,175			
Episcopal Training School.....		1,700	1,600	2,700	24,876	23,910
Friends.....		2,850	14,000	28,763	25,535	24,743
Mennonite.....	1,960	3,340	3,500	8,125	4,375	
Middletown, Cal.....		1,323	Dropped.			
Unitarian.....		1,350	5,400	5,400	5,400	5,400
Unitarian, Wrentham, Wis.....			1,850	4,050	7,560	9,180
Miss Howard.....				2,725	9,400	6,700
Appropriation for Lincoln Institution.....	33,400	34,400		33,475	600	33,400
Appropriation for Hampton.....	20,040	20,040	20,040	20,040	20,040	20,040
Total.....	228,269	382,214	376,264	529,905	561,960	554,558

IX. TITLES TO INDIAN LANDS.—The civilized nations of Europe, who had acquired territory on the American continent, asserted in themselves, and recognized in others, the exclusive right of the discoverer to appropriate the lands occupied by the Indians. By the treaty of 1783 the United States acquired all the rights to the soil which had previously been in Great Britain; and by its treaty of 1803 with France, in its purchase of Louisiana, it agreed to execute and respect all treaties made and agreed upon between Spain and the several tribes of Indians resident within the country ceded. In the case of Johnson & Graham, lessee, v. William McIntosh, Chief-Justice Marshall said in effect (8 Wheaton's Reports, p. 543) that there was no doubt that either the United States or the several States had a clear title to all the lands within the boundary lines described in the treaty with Great Britain, or within the limits of the Louisiana purchase, subject only to the Indian right of occupancy, and that the exclusive power to extinguish that right, was vested in that government which might constitutionally exercise it.

It was further settled in the case of the Cherokee Nation *v.* The State of Georgia (5 Peters, p. 1) that the Indians had an unquestionable and therefore an unquestioned right to the lands they occupied until that right of occupancy was extinguished by voluntary cession to the Government; that they occupied lands to which the United States asserted a title, independent of their will, which must take effect in respect of possession when their right of occupancy ceased. Hence, the claim of the Government to the lands of the Indian tribes extends to the complete ultimate title, charged with the Indian right of possession and to the exclusive power of acquiring that right. (See *Johnson v. McIntosh*, 8 Wheat, 543; *Fletcher v. Peck*, 6 Cranch, 87; *Holden v. Joy*, 17 Wall, 211; *Beecher v. Wetherly*, 95 U. S., 517.)

For an elaborate and exhaustive discussion of the question of title of the Indian lands of the United States, as affected by the Colonial laws, the laws of the thirteen original States, and the recognition of such title by the United States Government in treaty arrangements with the Indians and Congressional legislation the reader is referred to the Annual Report of the U. S. Commissioner of Indian Affairs for the year 1890.

GOVERNMENT PLAN OF CONVEYING LANDS BY ALLOTMENT.—Where it is suitable for agriculture or grazing purposes, it is the present policy of the Government to allot land in severalty to the Indians within their respective reservations—160 acres to heads of families, 80 acres to single persons over eighteen years of age, 80 acres to orphan children under eighteen years of age, and 40 acres to each other single person under eighteen years of age—to patent these individual holdings, with a restriction against alienation for twenty-five years, or longer, in the discretion of the President, and to purchase from the respective tribes any or all of the surplus land remaining after the allotments have been made. The general law for this is the allotment act of February 8, 1887 (24 Stat. p. 388), applicable to all reservations, except those of the five civilized tribes and three others in the Indian Territory, those of the State of New York, and one in Nebraska adjoining the Pine Ridge Sioux Reservation, which was set apart by Executive order for the purpose of suppressing liquor traffic with the Indians. In numerous instances, where clearly desirable, Congress has by special legislation authorized negotiations with the Indians for portions of their reservations without waiting for the slower process of the general allotment act, which involves the survey of the land, the allotment in severalty by special agents appointed by the President for that purpose, and negotiations with the Indians for the cession and relinquishment of their surplus unallotted lands.

It is estimated that under such special legislation about 13,000,000 acres of land have been secured by cession from the Indians during the past year; and there are agreements now pending before Congress, through which, if ratified, the Government will acquire some 4,500,000 acres more; all of which will, under the operation of these laws, be open to white settlement in the near future.

Of the land actually acquired, about 9,000,000 acres are in North and South Dakota, secured from the Sioux (act of March 2, 1889, 25 Stat., p. 888), and about 4,000,000 acres in Minnesota, acquired from the Chippewas (act of January 14, 1889, Stat., 25 p. 642).^{*} The agreements now pending in Congress

will, if ratified, restore to the public domain about 1,600,000 acres in North Dakota, in the Fort Berthold Reservation; about 660,000 acres in South Dakota, in the Lake Traverse (Sisseton) Reservation; about 185,000 acres in Idaho, in the Cœur d'Alène Reservation; about 1,095,000 acres in Colorado, being the whole of the southern Ute Reservation, and about 941,000 acres in Oklahoma Territory, now embraced in the Pottawattomie, Iowa, and Sac and Fox Reservations; a grand total of upwards of 17,400,000 acres, or about one-seventh of all the Indian lands in the United States.

Leaving out the five civilized tribes and the Alaska Indians, it would take about 80,000,000 acres of land to give to every Indian in the United States—man, woman, and child—160 acres each. There would still remain, in round numbers, 66,000,000 acres of Indian land, (exclusive of the reservations of the five civilized tribes), which, at \$1 per acre, probably a fair average, would yield \$66,000,000, the annual interest on which, at five per cent, would be \$3,300,000—a sum sufficient to pay the entire cost of educating all the Indian children in the United States. At the end of a few years, the principal sum might properly be distributed per capita among the rightful owners to assist them in improving their homes, when they could be left like other citizens to care for themselves.

Here is an immense landed estate belonging to the Indians, which, if judiciously managed by the Government, ought to place them on the high road to prosperity, and relieve the Government of a great financial burden.

The general allotment act of Congress of February 8, 1887, confirms the Indian title in all existing reservations. It provides that in all cases where any tribe or band of Indians has been or shall hereafter be located upon any reservation created for their use, "either by treaty stipulation or by virtue of an act of Congress, or by executive order, setting apart the same for their use," the President of the United States may, whenever in his opinion any reservation or any part thereof is suitable for the purpose, allot the lands of said reservation in severalty to the Indians located thereon, in quantities as specified; and that after lands shall have been so allotted, or sooner, if in the opinion of the President it shall be for the best interests of the Indians, it shall be lawful for the Secretary of the Interior to negotiate with such Indian tribe for the purchase and release by said tribe, in conformity with the treaty or statute under which such reservation is held, of such portions of its reservation not allotted as such tribe shall from time to time consent to sell, "upon such terms and conditions as shall be considered just and equitable between the United States and said tribe of Indians."

During the year closing October, 1890, allotments were made on various reservations, as follows:

Yankton Reservation in South Dakota,	1484.
Winnebago Indians,	932.
Grande Ronde, Oregon,	269.
Eastern Suwanee,	73.
Papago, or San Xavier, Ariz.,	291.
Confederated Peoria and Western Miami,	65.
Lac du Flambeau Lac Court d'Oreilles, (Lake Superior),	90.
Kickapoo Indian,	26.
Ojibwa,	1,700.
Devil's Lake Reservation,	800.
Nez Percé Reservation, Iowa, about,	2,000.
Quassa, Ind. Territory, about,	750.
Jicarilla Apache, New Mexico,	801.
Sac and Fox in Kansas and Nebraska,	71.

^{*}The Chippewas ceded all of their lands in Minnesota embraced in the several reservations occupied by them, except the White Earth Reservation, of which they ceded four entire townships, and excepting, also, the Red Lake Reservation, of which they ceded perhaps three-fourths; but it can not be

ascertained how much or just what particular portions of said reservations, except White Earth and Red Lake, have actually been relinquished to the United States until the Indians shall have selected and received the allotments to which they are entitled under said act.

The total number of acres included in the allotments is nearly if not quite 14,000,000. This shows a most gratifying progress.

X. LAWS AGAINST THE SALE OF INTOXICATING LIQUORS TO INDIANS.—The Indian Commissioner reports that one of the most difficult things to contend with in the administration of Indian affairs is the vice of intemperance. A large proportion of the Indians lead a life of idleness, and are therefore liable to yield to the temptations of drinking and gambling. This traffic appeals to the avarice of white men. The commission has dismissed a number of white employes for intemperance, and has refused to appoint any one who did not pledge himself to abstain from the use of intoxicating liquors as a beverage.

Sections 2139 and 2140 of the United States Revised Statutes provide as follows:

SEC. 2139. No ardent spirits shall be introduced, under any pretense, into the Indian country. Every person (except an Indian in the Indian country) who sells, exchanges, gives, barter, or disposes of any spirituous liquors or wine to any Indian under the charge of any Indian superintendent or agent, or introduces or attempts to introduce any spirituous liquor or wine into the Indian country, shall be punishable by imprisonment for not more than two years, and by a fine of not more than three hundred dollars. But it shall be a sufficient defense to any charge of introducing or attempting to introduce liquor into the Indian country that the acts charged were done by order of or under authority from the War Department, or by any officer duly authorized thereunto by the War Department.

SEC. 2140. If any superintendent of Indian affairs, Indian agent, or sub-agent, or commanding officer of military post, has reason to suspect or is informed that any white person or Indian is about to introduce or has introduced, any spirituous liquor or wine into the Indian country in violation of law, such superintendent, agent, sub-agent, or commanding officer, may cause the boats, stores, packages, wagons, sleds, and places of deposit of such person be searched; and if any such liquor is found therein, the same, together with the boats, teams, wagons, and sleds used in conveying the same, and also the goods, packages, and peltries of such person, shall be seized and delivered to the proper officer, and shall be proceeded against, by libel in the proper court, and forfeited, one-half to the informer and the other half to the use of the United States; and if such person be a trader, his license shall be revoked and his bond put in suit. It shall moreover be the duty of any person in the service of the United States, or of any Indian, to take and destroy any ardent spirits or wine found in the Indian country, except such as may be introduced therein by the War Department. In all cases arising under this and the preceding section Indians shall be competent witnesses.*

*An important phrase of the temperance question was presented by a letter of March 26, 1890, from the Hon. J. G. Blaine, Secretary of State, transmitting to the Indian Department a copy of a note dated Feb. 14, 1890, from the British Minister asking on behalf of the British Government to be advised whether this government had the disposition so to amend the law in regard to the sale of intoxicants to Indians as to make it applicable also to Canadian Indians temporarily within the United States. He requested the views of the American Government as to the sufficiency of the present law, and the practicability of a compliance with the wishes of Great Britain by an amendment of the law, should such action seem necessary. On April 5, 1890, Commissioner Moran said:

"This office would favor an amendment to the law in question so as to make it applicable to all cases of furnishing liquor to Indians within the United States, without respect to the relations said Indians bear to this government, and to whether they or their tribes are under the charge of a United States Indian agent or not.

Such an amendment, besides being a compliance with the wishes of the British Government on the subject, which appears to be actuated by a humane desire to promote the welfare of the Indians in Canada, would enable this government to extend its protection against the evil effects of whisky drinking, and the pernicious influences of white men who furnish them with whisky, to many of its own Indians who are not protected by existing laws, and is in my opinion much to be desired.

"Further, in my report of August 4, replying to the letter of July 17, 1890, from the chairman of the Committee of Foreign Affairs of the House of Representatives, expressing the doubt entertained by that committee as to the constitutional power of Congress to prohibit the sale of liquor (to Indians) within the States," I referred to decisions by the Supreme Court of the United States relative to the power granted to Congress over the subject of commerce with In-

XI. COURTS OF INDIAN OFFENSES.—Early in the year 1883 rules were formulated by the Indian Bureau, whereby certain specified barbarous and demoralizing practices among the Indians should be restricted and ultimately abolished. A system of Indian courts was organized, and a code of rules was prepared which enumerated the crimes and offenses of which the courts should take cognizance, and in several instances named the penalties which should be prescribed. Each court consists of three judges to be appointed by the Indian Office, upon the nomination of the respective Indian agents, for a term of one year, but subject to removal at any time. The court was to hold regular sessions twice a month. The crimes and offenses named in the rules were Indian dances, plural marriages, practices of medicine men, theft, destruction of property belonging to another, payments or offers of payment for living or cohabitating with Indian women, drunkenness and the introduction, sale, gift, or barter of intoxicating liquors.

The court also has jurisdiction over misdemeanors committed by Indians belonging to the reservations, over civil suits to which Indians are parties, and over any other matters which may be brought before it by the agent or with his approval.

The penalties prescribed are fine, imprisonment, hard labor, and forfeiture of rations. In civil cases the court has the jurisdiction of a justice of the peace, and conforms, so far as practicable, to the practices of a justice of the peace in the State or Territory in which the court is located.

Without money, legislative authority, or precedent, these courts had, in 1890, been established and maintained for eight years, and in spite of their crudities, anomalies, and disadvantages, had reached a degree of dignity, influence, and usefulness which could hardly have been expected.

Prior to the fiscal year preceding July 1, 1888, owing to want of funds, the judges gave voluntary service or were selected from the police or paid themselves out of the fines imposed and collected—incongruities which the Indians themselves were not slow to recognize. During that year the \$5,000 appropriated for the pay of the judges by Act of

Indian tribes by section 8 of the constitution of the United States, which seem to fully confirm its power to prohibit the sale of liquors to Indians, whether within the territorial limits of a State or not, and transmitted a draught of a bill by which it is proposed to amend sections 2139 and 2140 of the Revised Statutes, so that they will read as follows:

SEC. 2139. No spirituous or malt liquors or wine shall be introduced, under any pretense, into the Indian country. Every person, who sells, exchanges, gives, barter, or disposes of any spirituous or malt liquors or wine to any Indian, or introduces or attempts to introduce any spirituous or malt liquors or wine into the Indian country shall be punishable by imprisonment for not more than two years, and by a fine of not more than three hundred dollars.

SEC. 2140. If any Indian agent, sub-agent, officer of Indian police, or commanding officer of a military post has reason to suspect or is informed that any person is about to introduce or has introduced any spirituous or malt liquors or wine, or any intoxicating beverage whatsoever into the Indian country in violation of law, such agent, sub-agent, officer of Indian police, or commanding officer of a military post may cause the boats, stores, packages, wagons, sleds, and places of deposit of such person to be searched; and if any such liquor is found therein, the same, together with the boats, teams, wagons, and sleds used in conveying the same, and also the goods, packages, and peltries of such person shall be seized and delivered to the proper officer, and shall be proceeded against, by libel in the proper court, and forfeited, one-half to the informer and the other half to the use of the United States; and if such person be a trader his license shall be revoked and his bond put in suit. It shall moreover be the duty of any person in the service of the United States, or if any Indian, to take and destroy any ardent spirits or wine found in the Indian country, except such as may be introduced therein by the War Department. In all cases arising under this and the preceding section Indians shall be competent witnesses.

June 29, 1888 (25 Stats., 233), gave to the courts legislative recognition and to the judges small salaries, ranging from \$3 to \$8 per month, during seven months of the year. During the fiscal year closing in 1890 a similar appropriation of \$5,000 had been carefully husbanded and distributed; and by closing the court for one-third of the time, thus restricting its sessions to eight months in the year, and by paying the ninety-three judges not exceeding \$8 per month, and in several instances reducing the pay to \$5 and even \$3 per month, the office was able to maintain the court at twenty-five agencies.

For the ensuing fiscal year an appropriation of \$10,000 was made, which would enable the office to maintain these courts during twelve months at twenty-six agencies and to pay the judges' salaries as follows: Fifty-five judges at \$10 per month, ten at \$8 per month, twenty-three at \$5 per month, and ten at \$3 per month.

The importance, dignity, and, in many cases, unpopularity of the position of an Indian judge, is such that it should command a salary of at least \$10 per month; and the services rendered by the court are of such value in promoting good order and good morals in the community, as well as in familiarizing Indians with the customs, practices, and ideas which they will hereafter meet in white communities, that courts ought to be established for nearly every agency. To enable the office to do this, the full amount asked for the year 1891 was \$15,000.

XII. INDIAN POLICE SYSTEM.—For several years a system has prevailed, in the Indian Department of appointing under the supervision of the Indian Bureau, a native police force, for administration severally on the reservations. In the Congressional Act of 1890 making appropriations for the fiscal year ending June 30, 1891, the pay of the police was fixed at \$15 per month for each police officer, and \$10 per month for each private policeman. The following table shows the prevalence and cost of the system for the year ending June 30, 1890:

Agencies.	Indians.	Officers.	Privates.	Total of force.
Black Feet, Mont.	2,293	2	17	19
Cheyenne and Arapaho, Oklahoma.	3,598	3	29	32
Cheyenne River, S. Dak.	2,546	2	25	27
Colorado River, Ariz.	979	1	5	6
Colville, Wash.	2,301	2	14	16
Crow, Mont.	2,456	2	14	16
Crow Creek, S. Dak.	1,104	1	8	9
Devil's Lake, N. Dak.	2,356	2	16	18
Flathead, Mont.	2,018	1	14	15
Fort Belknap, Mont.	1,793	1	15	16
Fort Berthold, N. Dak.	1,195	1	7	8
Fort Hall, Idaho.	1,600	1	14	15
Fort Peck, Mont.	1,891	2	17	19
Grande Ronde, Oregon.	874	1	5	6
Green Bay, Wis.	3,820	1	10	11
Hoop Valley, Cal.	476	2	2	4
Jicarilla, New Mex.	801	1	7	8
Kaw, Oklahoma.	900	2	2	4
Kiowa, Oklahoma.	4,088	2	24	26
Klamath, Oregon.	904	1	7	8
La Pointe, Wis.	4,713	1	16	17
Lemhi, Idaho.	524	1	5	6
Lower Brulé, S. Dak.	1,067	1	13	14
Mescalero, N. Mex.	474	1	10	11
Mission, Cal.	4,524	1	6	7
Navajo, New Mex.	20,320	1	14	15
Neah Bay, Wash.	736	1	7	8
Nevada, Nev.	959	2	12	14
Nex Percés, Idaho.	1,450	1	5	6
Omaha and Winnebago, Neb.	2,347	1	7	8
Osage, Oklahoma.	1,496	1	4	5
Otoe, Oklahoma.	396	1	5	6

Agencies.	Indians.	Officers.	Privates.	Total of force.
Ouray, Utah.	1,030	1	6	7
Pawnee, Oklahoma.	851	1	7	8
Pima, Ariz.	11,518	1	10	11
Pine Ridge, S. Dak.	5,611	3	35	38
Ponca, Oklahoma.	533	1	8	9
Pottawatomie and Great Nemaha, Kan.	989	1	11	12
Puyallup, Wash.	1,844	1	13	14
Quapaw, Ind. T.	1,150	1	6	7
Rosebud, S. Dak.	7,586	8	40	48
Round Valley, Cal.	581	1	5	6
Sac and Fox, Oklahoma.	2,180	1	8	9
Santee, Neb.	1,354	1	11	12
Shoshone, Wyo.	1,945	1	12	13
Siletz, Oregon.	606	1	7	8
Sisseton, S. Dak.	1,487	1	5	6
Southern Ute, Col.	1,013	1	12	13
Standing Rock, N. Dak.	4,110	3	24	27
Tongue River, Mont.	867	1	7	8
Tulalip, Wash.	1,233	1	11	12
Uinta, Utah.	874	1	6	7
Umatilla, Oregon.	983	1	9	10
Union, Ind. T.	65,206	3	40	43
Warm Springs, Oregon.	853	1	9	10
Western Shoshone, Nev.	477	1	7	8
White Earth, Minn.	6,239	3	23	26
Yakama, Wash.	1,675	1	7	8
Yankton, S. Dak.	1,760	1	7	8
Total		70	700	770

XIII. INDIAN FARMING.—The Congressional act of March 3, 1875 (10 Stats. 449), requires that all able bodied Indians between the ages of eighteen and forty-five must labor for the benefit of themselves or of the tribe, in order to be entitled to rations.

The Indian agents in executive charge of the reservations are instructed to require every farmer to make monthly reports (for which blanks are furnished at the Indian Bureau) as indicated in the following schedule:

Number of days occupied in the field during the month.

Number of days at headquarters.

Number of Indians assisted and instructed.

Number of Indians who have been induced to begin farming.

Number of acres plowed.

Number of acres planted.

The condition of stock.

The condition of agricultural implements.

Agents are also directed to state the most pressing needs of the Indians under their charge for such articles as lumber, seeds, agricultural implements, and stock.

From the reports, some of them covering only nine months, from October, 1889, to June, 1890, it is ascertained that during that time 35,000 Indians had been personally assisted and instructed in farming; that 1,136 who never farmed before had been induced to commence; that 46,000 acres had been plowed, and at nearly every agency the need of a greater supply of lumber, seeds, and agricultural implements was very pressing. Had these reports been for the year, from all farmers employed, and exhaustive instead of partial, the figures would have been largely increased.

According to the year's census for 1889, the entire Indian population on the reservation where farmers were allowed during the year, was only 107,283. A close estimate as to the number of those who could be expected to work on a farm, would be one-seventh of this number—15,326, which for the nine months in question would give 8 per cent. as those who have been induced for the first time to com-

mence farming. If it is considered that nearly one-half of the 15,326 had already made a commencement, the percentage would be at least twice as great.

In the act of March 2, 1889, making appropriations for the service for the fiscal year ending June 30, 1890, provision was made for the employment, in addition to the agency farmers, of farmers who should superintend and direct the work among such Indians as were making effort for self-support. To this act a clause was added, requiring that no person should be so employed who had not been for at least five years engaged in practical farming.

The following table, prepared from the reports of the Indian agents, exhibits status of farming, etc., by Indians, *exclusive of the five civilized tribes*, up to July 1, 1890:

Number of allotments made to date (July 1, 1889) under act of February 7, 1887.....	9,827
Number of farms or Indian families engaged in farming.....	23,635
Number of acres under fence.....	496,787
Number of acres under cultivation (by Indians).....	269,355

AMOUNT RAISED LAST YEAR.

Bushels of wheat.....	836,741
Bushels of oats and barley.....	539,790
Bushels of corn.....	190,458
Bushels of vegetables.....	647,802
Tons of hay cut.....	110,372
Pounds of butter made.....	98,648

NUMBER AND KIND OF STOCK OWNED BY INDIANS.

Horses and mules.....	435,687
Cattle.....	153,774
Swine.....	27,353
Sheep and goats.....	942,857
Domestic fowls (all kinds).....	171,330

XIV. CASH PAYMENTS TO INDIANS.—During the fiscal year ending June 30, 1890, there was paid per capita to Indians (other than the five civilized tribes) the total sum of \$774,268, all regular annuities due in fulfillment of treaty stipulations, or interest on funds held in trust by the Government—a sum nearly \$130,000 greater than the amount for the previous year. This is accounted for by a special payment made to the Pottawatomie Nation (viz: the Citizen Band and the Prairie Band of Pottawatomies, and the Pottawatomies of Huron), in pursuance of the act of March 2, 1889 (25 Stats., 988), by which the sum of \$178,953.43 was appropriated, with interest at the rate of 5 per cent. from the date on which it was decided by the commissioner appointed for that purpose that said sum was still due to the Pottawatomie Nation from the Government. The interest amounted to \$182,728.61, making in all the sum of \$361,682.04.

The following paragraphs from the report of the Indian Commission for October, 1890, indicate the careful and wise methods observed in the payments of moneys to the Indians on the various reservations.

The Pottawatomies of Huron, who reside in the vicinity of Athens, Mich., are paid first, a special agent being sent for the purpose, with instructions to make a careful enrollment of the names of all who were living on the 1st of July, 1889, the day up to which the interest was computed, and on which the funds became available. This was done, the list was submitted to the scrutiny of the chiefs and head men, who, after examining it, certified that it was correct and complete, and the agent was directed to pay under the following rules: Each person of age to receive and receipt for his own share. This included married women.

The father (or mother, if father is not living) to receive the shares and receipt for the minor chil-

dren of the family, provided the parent was competent and properly qualified to act for the children, and that there was no reasonable doubt of the children receiving the full benefit of their money.

In case the parents were dead or incompetent, or in any manner not properly qualified to act for the children, then their shares were to be returned to the United States Treasury to await the children's coming of age.

The shares of all who had died since July 1, 1889, to be returned to the United States Treasury unless legal representatives of the estates of the deceased were appointed by the proper court.

The Commissioner of Indian affairs quoting the opinion of one of his most experienced agents, substantially affirms that the Indians are as frugal as the average white man would be under similar circumstances, and that he believes they are far more easily controlled and submit more cheerfully to the laws that govern them than any other community of his acquaintance. Could the government but protect them successfully from the evil consequent upon too close contact with degraded whites, their prosperity would greatly increase.

The following is reported as an official summary of the money earned by the Indians during the year ending June 30, 1890:

Paid to regular Indian employes at agencies.....	\$1,500
Paid to irregular Indian employes at agencies.....	54,500
Paid to Indian additional farmers.....	9,000
Paid to regular Indian employes at Indian schools.....	51,000
Paid to irregular Indian employes at Indian schools.....	22,000
Paid to Indian interpreters.....	20,000
Paid to Indian policemen.....	94,000
Paid to Indian judges of courts of Indian offenses.....	5,000
Paid to Indians for hauling supplies.....	90,000
Paid to Indians for produce, hay, wood, and other supplies purchased from them, and for breaking land.....	66,000
Paid to Indians for logs cut and banked by them....	139,000
Total.....	642,000

If to this is added annuity, interest, etc., it makes a grand total of \$1,416,268, paid in small cash payments to Indians during the year.

INDIANA, the county-seat of Indiana county, Pa., 72 miles northeast of Pittsburgh. It contains a State normal school, planing-mills, foundries, and has a large lumber trade. Pop. (1890), 1,963.

INDIANA, one of the States of the Union, is bounded on the east by the State of Ohio; on the south by the Ohio River; on the west by Illinois; on the north by the State of Michigan and Lake Michigan. The coast line is about sixty miles in length. The extreme length of the State is 276 miles, with an average breadth of 145 miles; and the area is 33,809 square miles.

Indiana occupies a table-land, gently undulating, except along the Ohio. There are no mountains or mountain ranges. With the exception of a small portion, the whole State inclines toward the southwest. The mean altitude of the State is estimated at 735 feet above sea-level. It is well watered. The Wabash is the largest river, and, with its branches, it drains three-fourths of the surface. The country south of the Wabash was originally covered with heavy forests of oak, beech, maple, walnut, ash and other hard woods; north of that river was principally prairie, interspersed with small lakes.

The coal-measures occupy over 7,000 square miles in the western and southwestern parts, furnishing workable seams, at a depth of 50 to 220 feet; the seams vary in thickness from two and a half to eleven feet; an area of 600 square miles in this field yields a superior "block" or splint coal. This is used in blast furnaces without coking, and is well adapted for the preparation of Bessemer steel. Natural gas has been discovered and utilized as a

fuel and illuminating agent in various portions of the State and the supply is apparently very great. Inexhaustible beds of fireclay, potter's clay, kaolin, lime, paving and building stone, are found in the southern parts of the State.

Agriculture is the chief branch of industry, the climate and soil being suited to the growth of cereals, fruits and grasses. In fact, Indiana is preëminently an agricultural State, having an area of 17,310,206 acres suitable for cultivation. Taking the seven leading crops, viz.: wheat, corn, oats, rye, barley, potatoes and hay, the average acreage for twelve years has been 9,165,421. The food products of Indiana in 1892, it has been estimated, were ample to support a population of 7,000,000. With all the arable land in the State under cultivation, even with the present comparatively rude methods of tillage, a population of 10,000,000 need not suffer for want of food. The meat product of the State for 1892 was sufficient to support a population of 6,440,277. While it is conceded that Indiana's largest source of wealth is, and must indefinitely continue to be, the products of her farms, her manufacturing enterprises are rapidly increasing in number.

The discovery of the Indiana natural gas belt has given a decided impetus to the manufacturing industries of the State. The interest which was suddenly aroused by this discovery, some five years ago, has abated but little. "The Indiana Gas Belt" is still one of the most prosperous, if, indeed, not the most prosperous, sections in the State. When the gas was first discovered, land values became abnormally high and speculation in real estate reached a pitch that might be properly denominated a craze. This soon subsided, however. Values became fixed and steady; attention was turned from land speculation to the development of the natural product, and the excitement that was born of the discovery soon gave way to the feeling that while the product was invaluable, the proper way to secure the resulting benefits was to make it the inducement for immigration and the inauguration of those business interests which would secure permanency and growth. The result has been that there has been attracted to the State nearly \$10,000,000 of capital, more than 10,000 artisans and workman, and 162 factories, none of which existed prior to the discovery of natural gas.

The total assessed value of taxable property for 1890 was \$782,872,126.

The State is divided into ninety-two counties. The governor is elected for four years. The legislature, which meets biennially, consists of a senate of fifty, elected for four years, and a house of representatives of one hundred, elected for two years. The judges (five) of the supreme court are elected for six years. All elections by the legislature are *viva voce*. The foreign State debt is \$8,056,615, and the domestic debt, \$484,000. The tax for State purposes is 12 cents and for schools 16 on the \$100.

The progress of popular education within the State during the past two years has been, upon the whole, very satisfactory. It is a gratifying fact that the increased average length of the schools in the State, the improvement in general attendance, and the general increase of interest upon the part of all parties concerned in the administration and organization of the public schools, show a steady and satisfactory growth.

The annual report of the State superintendent of public instruction, of date January 1, 1890, furnishes the following data: Enumeration of persons of school age (six to twenty-one years): Males, white, 385,521; colored, 9,722; females, white, 365,613; colored, 9,876. The enrollment included 269,786 males and 253,361 females; total enrollment,

523,147. Average daily attendance, 350,752. Teachers, 6,776 male, 6,477 female; total, 13,253. There were 9,928 schoolhouses. The common school fund for the year amounted to \$3,566,084, an increase of \$262,936 over the preceding year; the congressional school fund was \$2,494,105. The total school funds, June, 1890, amounted to \$9,784,170, which included \$3,904,783 of non-negotiable bonds. The value of school property and apparatus, in 1890 was \$14,979,339. In 1891 there were nearly 10,000 schoolhouses in the State, of an estimated value, with their grounds and apparatus, of \$14,979,339.

The State university is at Bloomington, and the State normal school at Terre Haute. The function of the latter is to fit its pupils to become teachers in the common schools.

The official census returns of 1890 show a total population of 2,192,404.

The following are the chief towns, with official population in 1890: Indianapolis, 105,436; Evansville, 50,756; Fort Wayne, 35,393; Terre Haute, 30,217; New Albany, 21,059; Lafayette, 16,243; South Bend, 21,19; Richmond, 16,608; Logansport, 13,228; Jeffersonville, 10,666.

The following is a complete list of the governors of the State:

TERRITORIAL.

Wm. H. Harrison.....	1800-11	John Gibson.....	1811-13
Thomas Posey.....	1813-16		

STATE.

Jonathan Jennings.....	1816-23	Ashbel P. Willard.....	1857-61
Wm. Hendricks.....	1822-25	Oliver P. Morton.....	1861-67
James B. Ray.....	1825-31	Conrad Baker.....	1867-73
Noah Noble.....	1831-37	Thomas A. Hendricks.....	1873-77
David Wallace.....	1837-40	James D. Williams.....	1877-81
Samuel Bigger.....	1840-43	Albert G. Porter.....	1881-85
James Whitcomb.....	1843-48	Isaac P. Gray.....	1885-89
James C. Dunning.....	1848-49	Alvin P. Hovey.....	1889-93
Joseph A. Wright.....	1849-57	Claude Matthews.....	1893-..

For numerous additional items of interest relating to the State of Indiana, see the article UNITED STATES in these Revisions and Additions.

INDIANAPOLIS, a city and capital of Indiana, and county-seat of Marion county, situated on the West Fork of White River, 109 miles N. W. of Cincinnati, and 195 miles S.S.E. of Chicago. Lat. 39° 50' N., long. 86° 5' W. The site is nearly level. The streets generally cross one another at right angles, except four wide diagonal avenues, which converge to a circular park in the center of the city. Indianapolis contains a fine court-house, the State institution for the deaf and dumb, the blind, and the insane, besides numerous other public structures. It is the most populous city of the State, and was selected as the seat of government in 1820. It is the terminus of 13 railroads running in all directions, furnishing the best facilities for distributing the city manufactures throughout the country. It is near the center of the great corn-belt of the West and is thus the natural market for an extensive area. It has many grain-elevators, flouring-mills, and pork-packing establishments, and in the direction of manufactures has made good progress, having extensive rolling-mills, malleable iron-works, carriage shops, foundries, and machine shops; manufactories of agricultural implements, glass, organs, carriages, railroad-cars, sewing-machines, pianos, cotton goods, woolen goods, furniture, sash, blinds, etc. There are upwards of thirty incorporated manufacturing companies, and there is an aggregate of above \$15,000,000 capital invested. The city has an excellent fire department, and an ample water supply. The various points of the city are connected by horse-cars. Population in 1850, 8,090; in 1860, 18,611; in 1870, 48,244; in 1880, 75,056; in 1890, 107,445.

INDIAN CORN OR MAIZE, Uses of. For the history and description of this cereal see MAIZE, Britannica, Vol. XV, pp. 309-310. No other crop of our American farms supplies so many wants as Indian corn. It is very nutritive, containing 11.6 per cent. protein, or flesh-forming material, and 6.5 per cent. fat; whereas, wheat contains 11.7 per cent. protein, and 1.6 per cent. fat. The nutritive quality can be increased by enriching the soil.

For domestic uses, as a food-grain, corn is served in various forms, and is equally relished by rich and poor. The sweet varieties furnish a toothsome dish, when the ears are taken green, boiled and the kernels eaten from the "cob" with butter. For "canned corn" the full grown kernels are cut from the cob while yet in the milk, and then boiled, or boiled on the cob and cut afterwards, which latter method gives the better article. Sealed up in air-tight tin-cans it can be kept for years, and always finds a ready sale in America and in Europe. Another way of preparing corn for the market is by cooking it before it is fully ripe; then taking it from the cob and kiln-drying it on revolving machines heated for the purpose. There are several million dollars worth sold annually in this way.

"Hulled corn" is prepared by boiling shelled corn in lye made of wood ashes until the hull becomes loose. It is then washed, the hull is rubbed off with the hands, and the grain is washed again until the alkaline taste is removed. Then it is boiled until soft, and usually served in milk. This affords a much relished dish in the farm house. Corn is often cracked in mills and the chaff removed by sifting. This is sold as "hominy" in the West and South, and is known as "samp" in New England. It requires considerable boiling to make it edible. It is usually served with milk.

Cornmeal contains more albumen than wheat flour, because less of it is removed with bran than in the case of wheat. The famous "Indian pudding," "hasty pudding," "cornbread," etc., are all made of cornmeal, and are healthful, palatable, and nutritious, and, moreover, as cheap as any other human food. Cornmeal bakes rather badly, as compared with wheat flour, because it contains four times as much fat as the latter, and this richness in fat prevents its fermentation and rising. It is therefore often mixed with rye or wheat-flour, and baked into "rye-and-Indian bread."

Indian corn contains from 60 to 65 per cent. of starch, and "corn starch," which is manufactured from it on a large scale, is much used for stiffening clothes and making cakes, custards, and puddings. Large quantities of corn-starch are converted into glucose or grape-sugar, which is now chiefly employed in beer breweries and confectioneries.

As feed for all kinds of stock, Indian corn takes the foremost place in winter. It is mostly fed in the ear, seldom shelled or ground, except when fed to poultry. Milch cows give much rich milk when fed on corn, because it contains so much fat and oil. Cattle and hogs fatten rapidly on it, because of its large contents of starch, of which a portion is converted into glucose in the animal system. The most economical way of feeding corn is by cracking or grinding it. This permits the more perfect assimilation of the nutritive properties of the grain, the benefits of which are largely lost when the corn is fed whole and unbroken.

For "fodder-corn" the seed is sown in June, either in drills or broad-cast, and the crop is harvested when the ears are developed, but before they are ripe. It is cut and dried like grass and hay. Often the stalks and leaves are harvested while green, then cut fine by machinery and placed into close pits in the ground or in air-tight compartments

on the surface, called "silos." The exclusion of the air preserves the fodder from decomposition and enables the farmer to feed it all winter in the succulent state.

The stalks, husks, and leaves of corn, which remain after the ears have been plucked off, are also used as food for cattle, and are usually designated by the term "fodder." They assist very largely in feeding the farm stock during winter. Even the corn cobs are eaten. They contain over three per cent. of protein, and are as nutritive as coarse hay.

For information as to the sugar contents of corn stalks, see SUGAR, also CORN CROP, in these Revisions and Additions.

INDIAN FIRE, or **INPYROTECHNY**, a bright white light produced by burning a mixture of sulphur, realgar, and niter.

INDIANOLA, the county-seat of Warren county, Iowa, located 20 miles south of Des Moines. It manufactures farm-implements and is seat of Simpson College. Pop. (1890). 2,254.

INDIANOLA, formerly a village of Calhoun county, Texas, on the west shore of Matagorda Bay, 10 miles from the Gulf of Mexico. It was of considerable importance and contained in 1870, 1,900 people. It had a thriving trade in cotton, cattle, hides, and wool, but in Sept. 15, 1875, a terrible storm caused the waters to rise and a large part of the village was swept away. Another storm in 1886 completed its destruction.

INDIAN RIVER, a narrow tidal channel parallel with the Atlantic coast, and lying in Brevard and Volusia counties, Fla. It is about 100 miles long, and finds an outlet to the ocean at Jupiter inlet. It is navigable for boats drawing not more than 5 feet, and as the climate of the locality is healthful, and fish abound in the river, this is a resort for invalids and sportsmen.

INDIAN SUMMER, in the United States, a period of late autumn characterized by calm, dry, and hazy weather. The name is due to the fact that this condition was especially noticeable in the region chiefly occupied by the Indians at the time the term was introduced.

INDIAN TERRITORY. For general article on the INDIAN TERRITORY, see Britannica Vol. XII, pp. 833, 835. Area, as returned by the U. S. Census of 1890, 31,400 square miles including 400 square miles of water surface. Population (including Indians—census report 1890) 177,558. The chief town is Talequa, capital of the Cherokee Country.

By the act of Congress, approved by the President May 2, 1890, creating the Oklahoma Territory, the boundaries of the former Indian Territory were changed, and the new Indian Territory was defined to comprise "all that part of the United States which is bounded on the north by the State of Kansas, on the east by the States of Arkansas and Missouri, on the south by the State of Texas, and on the west and north by the Territory of Oklahoma." In other words, all that portion of the old Indian Territory occupied by the five civilized tribes and by the several tribes under the jurisdiction of the Quapaw Agency, now composes the Indian Territory. The area is less than half that of the old Indian Territory.

The said act, in sections 26 *et seq.*, proceeds to limit the jurisdiction of the United States court in the Indian Territory established by the act of March 1, 1889 (25 Stats., 783), to the Indian Territory as above defined, and to enlarge the authority conferred on that court by the said act, giving it jurisdiction within the limits of the said Indian Territory over all civil cases therein, except those over which the tribal courts have exclusive jurisdiction.

The Indian Territory is divided into three judi-

cial divisions, and courts are now held for the first division, consisting of the country occupied by the Indian tribes in the Quapaw Agency, the Cherokee country east of ninety-six degrees of longitude and the Creek country, at Muscogee, in the Creek Nation; for the second division, consisting of the Choctaw country, at South McAlester, in the Choctaw Nation; and for the third division, consisting of the Chickasaw and Seminole countries, at Ardmore, in the Chickasaw Nation.

The court is given probate jurisdiction, and certain of the general statutes of the State of Arkansas are extended over and put in force in the Indian Territory.

It is authorized to appoint not more than three commissioners for each judicial division, who "shall be *ex officio* notaries public and shall have the power to solemnize marriages;" they shall also "exercise all the powers conferred by the laws of Arkansas upon justices of the peace within their districts."

Except as otherwise provided in the law, appeals and writs of error may be taken and prosecuted from the decisions of this court to the Supreme Court of the United States, in the same manner and under the same regulations as from the circuit courts of the United States.

Much good is expected to result from the enlarged jurisdiction of the court, and especially from that provision of the law which gives the judge of the "United States court in the Indian Territory the same power to extradite persons who have taken refuge in the Indian Territory, charged with crimes in the States or other Territories of the United States, that may be now exercised by the governor of Arkansas in that State." This power properly exercised will, it is expected, have the effect to purge the Territory to a great extent of the criminal element that for years is said to have found an asylum there, where pursuit and punishment seldom, if at all, found its way, and to which much of the introduction of whiskey and the moral degradation of many of the Indians is due.

POPULATIONS IN INDIAN TERRITORY, CLASSIFIED.—The following figures have been compiled from the figures reported in the official census of 1890:

	Indians	Colored	Whites	Total
Cherokee Country	25,357	4,242	27,176	56,775
Chickasaw Country	8,464	3,718	49,444	66,626
Choctaw Country	9,996	4,401	27,991	42,388
Creek Country	9,291	5,841	3,280	17,912
Seminole Country	2,539	22	96	2,657
Quapaw Country	1,224	.....	.....	1,224
Chinese in Chickasaw Nation .....	.....	6	.....	6
Total	51,871	17,730	107,987	177,588

Indian citizenship in the first five tribes above (designated as "The Five Civilized Tribes,") is regulated by tribal laws. Freedmen and other negroes become citizens of the several tribes under said laws.

The Eastern Cherokee tribe of Indians live on the Eastern Cherokee Reservation in North Carolina. Rations are not issued by the United States to these Indians. For additional important information concerning populations of this Territory, see R. S. Peale's edition of the *Britannica*, Vol. XII, pp. 822-835. Also maps of the Indian Territory and Oklahoma in these Revisions and Additions.

INDIGIRKA, a river of Siberia, in the government of Yakutsk. It rises in the Yablonoi Mountains, flows north for about 750 miles, through a frozen desert, and falls into the Arctic ocean in latitude 71° north, and longitude 150° east.

INDORSED, ENDORSED, or ADDORSED, terms

applied in heraldry to two animals placed back to back.

INDORSEMENT, the term generally used to denote the writing of the name of the holder on the back of a bill of exchange or promissory note, on transferring or assigning it to another. Signing the name "A. B." alone is a blank endorsement, and if the transferee is named it is an indorsement "in special," or "in full." The usual form is "Pay C. D. or order, (signed) A. B." When personal liability is to be avoided the words "without recourse" are added, and in this case no demand can come back on the indorser, who would otherwise be liable.

INDULGENCE is generally defined as the remission by church authority of the temporal penances due for sins committed. But the writings of Tertullian (*De Pudicitia*) point to a primitive belief that the merits of the saints will be efficacious also in remitting the sins of the faithful before God; and the invocations of the saints' intercession before God, as practiced by the Roman Catholic church of to-day, shows that the remissions believed in are not only relaxations of canonical, that is external penances, but also forgiveness of sins by God himself. The Catholic church teaches that it possesses a "Treasury of Merit" (*Thesaurus Ecclesie*) accrued from the sufferings of Christ and of the martyrs, and also from the good works of the saints. Based upon this treasury and superabundance of merit, the church claims the power of remitting—not the sin itself but—the guilt of sin, and, in consequence, also its external punishment. That the church can condone temporal punishment is deduced from St. Paul's example in forgiving a sinning Corinthian (2 Corinth ii. 10), and from the power of binding and of loosing as conferred upon St. Peter, and subsequently upon all the apostles (Matt. XVI, 18). A "plenary" indulgence remits the entire satisfaction due to God; a "partial" indulgence only remits it in part. The jubilee is a plenary indulgence conferred upon all contrite confessors.

Indulgences are also applied to the souls of the departed by way of intercession. The living obtain the indulgence from the church and present it to God, who may or may not, remit the sins of the departed soul. The church assumes that He *does* accept it, and thus ratifies her action. The indulgence of the "privileged altar" was explained by the Sacred Congregation of Indulgences (July 28, 1840) to mean a plenary indulgence which forthwith liberates the soul from all the pains of purgatory. These altars are privileged, "each time the eucharistic sacrifice is offered, to possess, and set apart, a sufficient portion of the church's treasure of merits to obtain from God, if it so pleaseth him, the release of the prayed-for soul from purgatory."

INDUSIAL LIMESTONE, a variety of freshwater limestone found in Auvergne, France and some other localities, formed of the cases (indusia) of caddice-worms, great heaps of which have been encrusted with carbonate of lime, and formed into a hard travertine.

INDUSTRIAL EXHIBITIONS. For the great industrial exhibition held in Europe and America before 1876, see *Britannica*, Vol. VIII, pp. 803-805. Exhibitions of mechanical arts have been periodically made in the United States by several institutions. Prominent among these are the exhibitions of the American Institute of New York, the Franklin Institute of Philadelphia, and the Mechanics' Fairs in Boston. All of them have done much to stimulate invention and to awaken popular interest in the mechanic arts. The farmers are equally enterprising; agricultural fairs are now held regularly in almost every state of the Union, and annu-

ally in many counties; and these fairs embrace usually mechanical products of city and country throughout their districts. See *World's Fairs*, in these Revisions and Additions.

INFANTE, the title given in Spain and Portugal to the princes of the royal family, the corresponding title of *infanta* being given to the princesses. The personal domain of an infante or infanta is called the *infantado*.

INFANTRY, AMERICAN, see *ARMY OF THE UNITED STATES*, in these Revisions and Additions.

INFANT SCHOOLS. Pastor Oberlin may be regarded as the founder of infant schools. The education and training of young children were also matters of great interest and study to Pestalozzi. The most successful system of educating quite young children is the Kindergarten. See *Britannica*, Vols. XIV, p. 79; XVII, p. 704.

INFECTMENT, a Scotch law term, used to denote the symbolical giving possession of land, which was the completion of the title, the mere conveyance not being enough. The instrument of sasine was the notarial instrument embodying the fact of infectment.

IN FORMA PAUPERIS ('in the character of a poor person'). Persons are said to sue *in forma pauperis* when the law allows them to conduct lawsuits without paying fees to court-officers, counsel, or solicitors. A suitor *in forma pauperis* is not entitled to costs unless by order of the court.

INFUSIONS, aqueous solutions of vegetable substances obtained without the aid of boiling. In this respect they differ from decoctions, in the manufacture of which boiling is resorted to. Infusions are prepared by digesting the vegetable substance in hot or cold water in a covered earthenware vessel. In preparing the infusion of calumba, cold water is preferable, because it takes up the bitter principle, which is the essential ingredient, and leaves the starch-matter undissolved. In most cases, however, boiling water is employed. Infusions are preferred to decoctions when the active principle volatilises at a boiling heat, or when ebullition readily induces some chemical change. Infusions may also be prepared by percolation, a process extensively employed in the preparation of tinctures. When thus prepared they are less liable to decay than when prepared on the old system.

INGALLS, JOHN JAMES, a United States Senator, born in 1833. He graduated at Williams College in 1855 and was admitted to the Massachusetts bar in 1857, and the following year went to Kansas. In 1860 he was secretary of the Territorial Council; was Secretary of State in 1861, and a member of the State Senate in 1862. In 1873 he became a member of the United States Senate as a Republican, and was reelected in 1879 and 1885. His term of office expired March 3, 1891.

INGELOW, JEAN, an English poetess, born at Boston, Lincolnshire, in 1830. Her father being of superior culture gave Jean, who was very reserved, an unusually good education. A volume of *Poems* published in 1863 established her reputation as a poetess, and the *Songs of Seven* and the *High Tide on the Coast of Lincolnshire*, etc., increased her fame. Her prose works include *Studies for Stories*; *Stories Told to a Child*; *Mopsa, the Fairy*; *Off the Skelligs*; *Fated to be Free*; *Sarah de Berenger*, and *Don John*.

INGERSOLL, CHARLES JARED (1782-1862), an American statesman. He was admitted to the Pennsylvania bar, and was attached to the United States embassy to France. From 1813 to 1815 he was in Congress, and then became United States district attorney, which office he held till 1829.

Shortly afterward he served in the legislature, and in 1837 became secretary of legation to Prussia. From 1841 to 1847 he was again in Congress, and distinguished himself as a Democratic leader. He contributed extensively to various periodicals, and wrote *Edwy and Elgira* (1801); *Inchiquin the Jesuit's Letters on American Literature and Politics* (1810); and *Historical Sketch of the Second War Between the United States and Great Britain* (1852).

INGERSOLL, JARED (1749-1822), an American jurist. He became a prominent lawyer, and espoused the cause of the colonies in the Revolution. He was twice attorney-general of Pennsylvania, and was United States district attorney for the eastern district of Pennsylvania. At the time of his death he was judge of the district court of Pennsylvania.

INGERSOLL, JOSEPH REED (1786-1868), an American lawyer. He began the practice of law in Philadelphia, Pa., and from 1835 to 1837, and again from 1843 to 1849 was a member of Congress. In 1852 he was appointed minister to England, but the following year retired to private life and devoted himself to literature. He wrote *Secession a Folly and a Crime*; *Memoir of Samuel Breck* (1863); and a translation from the Latin of Roccus's tracts *De Navibus et Naulo* and *De Assecuratione* (1809).

INGERSOLL, ROBERT GREEN, an American lawyer, born in 1833. He began the practice of law in Shawneetown, Ill., but in 1857 removed to Peoria. In 1866 he was appointed attorney-general for Illinois, and in 1877 refused the post of minister to Germany. He is well known as a campaign orator, and also by his books and speeches. He has published *The Gods* (1878); *Ghosts* (1879); *Some Mistakes of Moses* (1879); *Lectures Compiets* (1883); *Prose Poems and Selections* (1884); and a large number of minor works.

INGERSOLL, a town of Oxford county, Ont., Canada, on the Thames River. It contains fine public buildings, and manufactories of woolen goods, cheese, and farm-implements, and carries on a brisk trade in lumber and grain.

INGLEBY, CLEMENT MANSFIELD, an English author and Shakespearean scholar, born at Edgbaston, near Birmingham, in 1823, died in 1886. He was professor of logic and metaphysics at the Midland Institute from 1855 to 1858; became foreign secretary to the Royal Society of Literature in 1870, and afterwards vice-president to the society. Among his works on Shakespeare we have his *Complete View of the Shakespeare Controversy*; *Shakespeare Hermeneutics*, and *Shakespeare, the Man and the Book*. His other works include *Outlines of Theoretical Logic*, and an *Introduction to Metaphysics*.

INGRAHAM, DUNCAN NATHANIEL, a naval officer, born in 1802. He entered the United States navy as midshipman in 1812; became lieutenant in 1818; commander in 1838; captain in 1855, and chief of the Bureau of Ordnance and Hydrography of the Navy Department in 1866. In 1861 he entered the Confederate naval service, as chief of ordnance, construction and repair, and rose to the rank of commodore. He has served in every war since the Revolution.

INHERITANCE TAX. The question of whether the estates of deceased persons should be subject to taxation by the State is one which has been agitated more or less during the past decade (1880-1890), and which, since the introduction of the five per cent. direct inheritance tax in the State of New York in 1891, has been brought more than ever prominently before the public. Notwithstanding that a collateral inheritance tax had existed in Pennsylvania since 1826, in Maryland since 1844, in Delaware since 1869, and was adopted by Massa-

chusetts and New Jersey in 1891 and 1892 respectively, the imposition of the direct levy in the Empire State called forth a storm of vituperation. On the one side lawyers and laymen have alike united in denominating it unconstitutional. It has been styled "an infamous measure of taxation," "a penalty on death," "stealing from the estate by legislative authority," and "an outrage that can only find precedent in Oriental autocratic governments." On the other side of the question are arrayed those who think that of all forms of taxation this is the wisest; that men who continue hoarding great sums all their lives, the proper use of which for public ends would work incalculable good, should be made to feel that the community, in the form of the State, cannot be deprived of its just share, and that by taxing estates heavily at death the State marks its condemnation of the selfish "millionaire's unworthy life."

The tax has been productive of considerable revenues. In New York, for the fiscal year ending 1892, the receipts from the tax have amounted to nearly two million of dollars. A million dollars annually is collected in the State of Pennsylvania from the collateral inheritance tax.

Repeated tests of the constitutionality of the direct and collateral systems of taxation have been made in the different tribunals of this country. In North Carolina, Pennsylvania, Maryland, Virginia and New York the courts have sustained the laws. Similar enactments, however, have been declared illegal by the supreme courts of New Hampshire and Minnesota, on the ground of unconstitutionality, in the first named state, and in the second, where the law required the payment of the fee before the estate could be settled, because it was held that its imposition was a tax upon the obtaining of justice, that justice "which every one ought to obtain freely and without purchase." The Supreme Court of New Hampshire said: "It is plainly founded upon pure inequality, and is simply extortion in the name of taxation; and it can, therefore, never be sustained in this jurisdiction so long as equality and justice continue to be the basis of constitutional taxation." Notwithstanding, however, these adverse decisions in two important States, the movement in favor of the imposition of the tax is steadily gaining ground, and the general trend of public opinion affords a basis for the belief that it will ultimately be universally adopted in this country. In New York the State comptroller has recently proposed making the direct inheritance tax progressive, increasing the rate by degrees to 5 per cent. on the estates of millionaires. A law framed on this model is already in operation in Australia, where the duties on the estates of deceased persons constitute a not inconsiderable source of revenue, and progressive rates of taxation are imposed in most of the colonies. In Victoria the maximum is 10 per cent.; in New South Wales, 5; in South Australia the duty is graduated from 1 to 10, according to relationship, and in New Zealand 13 per cent. has been fixed upon as the maximum. In 1892, an inheritance tax was adopted in the province of Ontario, Canada. In Switzerland, in six cantons, the rates are progressive. In Geneva, distant relatives pay 15 per cent. The rates in Prussia are from 1 to 8 per cent., according to relationship. The maximum rate in France is $11\frac{1}{4}$ per cent. Spain, Italy, England, Denmark, Belgium, Roumania, Poland, Russia, Norway and Austria have also inheritance taxes. The English system is a very complicated one, but is so contrived as to make the tax a slightly progressive one. In Queensland 20 per cent. is taken from large sums bequeathed to persons

of no kin to the testator. In Cape Colony the tax varies from 1 to 5 per cent.

The theory that the inheritance tax would lead very rich men to dispose of their property during life, in order to avoid its imposition upon their estates, was at one time widely prevalent, but does not seem to be borne out by the practical working of the different statutes. Whether or not the democratic tendency of the times will bring about legislation seeking still further to discourage the building up and transmitting unimpaired to posterity of gigantic fortunes, is, of course, mere matter for conjecture. It is a significant fact, however, that some of the wealthiest individuals in the State have themselves been among the most persistent advocates of the direct inheritance tax, and have urged extensions of it to a degree which almost trenches upon the doctrines of socialism. One of these, Mr. Andrew Carnegie, is quoted as saying that he would like to see an inheritance tax rising as high as fifty per cent. in the case of multi-millionaires.

INNES, THOMAS, a Scottish historian, born at Drungask, Aberdeenshire, in 1662, died at Paris, Jan. 28, 1744. At fifteen he was sent to Paris, where he studied at the College of Navarre, and the Scots College. In 1692 he received priest's orders, and after three years of mission work in Bauffshire returned to Paris and became prefect of studies in the Scots College. His *Critical Essay on the Ancient Inhabitants of Scotland* (2 vols., 1729) is much the earliest of all scientific histories. It was meant for an introduction to a *Civil and Ecclesiastical History of Scotland*, one volume of which, coming down to Columbus's death, he prepared for the press, while another, bringing down the narrative to 831, was left incomplete. The work retains a permanent value.

INNESS, GEORGE, an American landscape painter, born in 1825. At the age of twenty-one he began landscape painting in New York city. He then made visits to Europe, and resided in Florence and Rome for some time. He returned to New York about 1868, and from 1871 to 1875 again lived in Italy. Among his best paintings are *The Sign of Promise*; *Peace and Plenty*; *Going Out of the Woods*; *The Valley of the Shadow of Death*; *Summer Sunshine and Shadow*; *Pine Grove*; *American Sunset*; *St. Peter's*; *Rome, from the Tiber*.

INSECTS and INSECTICIDES. For an extended article on INSECTS, see *Britannica*, Vol. XIII, pp. 141-154.

"Insects proper" have their bodies divided or cut into three very marked portions, the head, thorax, and abdomen, and have usually six legs, two antennae, or feelers, and two pairs of membranous wings; they breathe through air-holes, called *stigmata*, placed along the sides of the abdomen and connected with air-tubes, called *tracheæ*, which carry the inspired air into every part of the body. Spiders, crabs, and myriapods are not insects proper. Most insects pass through a metamorphosis or several changes of form and habits. In their period of infancy insects are known as *larvæ*. They are worm-like, very voracious, and cast off their skins repeatedly. Grubs, caterpillars, maggots, silkworms, etc., are *larvæ*. Some of them lose their larva form after awhile, take no food, and remain at rest in a death-like sleep. This is called their *pupa* state, because in this condition they resemble an infant trussed in bandages. The pupæ from caterpillars are called *chrysalides*, as some of them are adorned with yellow spots, as if they were gilt. Grubs, after their first transformation, are often called *nymphs*. At the end of the second period insects again shed their skins, and come forth fully grown

and usually provided with wings. The winged state is called *imago*. In this, their perfect state, they provide for the continuation of their kind. The larva state lasts the longest, and the adult state the shortest; for they often die immediately after they have laid their eggs. Bees, wasps, and ants, however, continue much longer in their adult state. After this short introduction we mention the most common insects injurious to vegetation.

I. INSECTS INJURIOUS TO GARDEN VEGETABLES.—The *Asparagus Beetle* (*Crioceris asparagi*) was accidentally introduced into Long Island, N. Y., from Europe in 1860, and has since so multiplied there as to cause a dead loss of some \$50,000 to the asparagus growers on the island. It has recently spread west on the mainland of the State of New York. [Fig. 1.] This beetle is blue-black, but the thorax is brick-red. The wing-cases have various markings on their sides. The insect passes the winter in the beetle state under loose bark. When the asparagus is ready to be cut for the table, the beetle comes forth from its winter quarters and lays its eggs. After being hatched out the brood of larvæ eats the tender parts of the plants, and afterwards consumes also the tougher and harder bark of the main stalks. At the end of June the larvæ hide under some rubbish or in the loose ground, form slight cocoons there, and pass into the pupa state. From these pupæ there bursts forth the same season a second brood of beetles, which lays its eggs on the asparagus, and produces in the middle of August a second brood of larvæ or grubs, whence in the same manner, as before, there comes forth in September the brood of beetles destined to reproduce the species in the following spring. These beetles become so numerous as to destroy many asparagus farms of 20 acres in extent. But in 1863 a deliverer appeared in the form of a small, shining, black parasitic fly. This fly lays its eggs in the eggs or larvæ of the asparagus beetles. It develops faster than the latter and destroys it. The damage done by this beetle has therefore been slight since 1863. The straight line in the illustration shows the actual size.

The American Bean and Pea Weevils.—(*Bruchus fabæ* and *Bruchus pisi*). The first [Fig. 2] has spread from Rhode Island since 1861. It is similar to the latter, but a little smaller. As many as fourteen larvæ have been counted in a single bean. The little spots where the larvæ entered a pea can always be detected, even in a dry pea; but in the beans these points of entrance become obliterated. The larvæ grow in the beans and peas, while they eat the seeds, and in the end there is nothing but an excrementitious powder left in the pods. The body of these weevils is oval, slightly convex; their feelers are small and bent sideways; their wing-cases do not cover the end of the abdomen. These beetles frequent the leguminous plants. They wound the skin of the tender pods and lay their eggs singly into the wounds. Each of the maggot-like grubs hatched therefrom enters a seed and feeds upon its pulp until fully grown. Persons indulging in early green peas swallow these larvæ very frequently. The pea-weevil is a native of the United States. It has spread from Pennsylvania over the Eastern States. A simple method of checking the ravages of these bugs is to keep seed-beans and seed-peas in tight vessels over one year before planting them, and to put them in hot water just before they are planted, so as to kill the weevils.

Cabbage Butterfly, White Butterfly, Potherb Butterfly (*Pieris oleracea*).—In May and June these butterflies are seen fluttering over cabbage, radish and turnip beds for the purpose of depositing their eggs. These are fastened to the undersides of the

leaves. Their wings are white with little black marks; their antennæ short; and their flight lazy and lumbering. [Fig. 3.] Their eggs are hatched in a week, and the caterpillars produced from them are one and one-half inches long, and of pale green color. In devouring the cabbage, they begin at any place on the under-side of the leaves and eat irregular holes through them. Besides cabbages they eat cauliflower, spinach, turnips, beets, carrots, mignonettes, etc.

To the same species of insects belong the *Rape Butterfly* (*Pieris rapæ*) and the *Southern Cabbage Butterfly* (*Pieris protodice*).

The Zebra Caterpillar [Fig. 4], is also destructive to cauliflowers, cabbages and beets. It is two inches in length, velvety black, with a red head, red legs, and with two longitudinal yellow lines on the sides, between which are numerous transverse white lines that give it the name. It changes to the chrysalis [Fig. 5], within a rude cocoon formed just under the surface of the ground by interweaving a few grains of sand or particles of dirt with silken threads. The moth, which is called the "Painted Mamestra" (*Mamestra picta*) appears in mid-summer. It is a prettily marked species; the front wings are purple-brown with round spots; the hind wings are white. There are two broods of this insect each year, one in August and the other in October. On account of the gregarious habit when young they are easily destroyed in their larva state.

The Squash-bug (*Coreus tristis*) punctures the leaves of squashes. It lays its eggs at the end of June (in the Northern States), depositing them in little patches, brownish-yellow, and glued to the squash leaves. They soon hatch, and the larvæ, or young bugs, are more rounded in shape than the perfect insects. [Fig. 6.] They remain in clusters until grown, penetrate the leaves with their beaks, living upon the juice of the leaves until they wither and die. Then the bugs pass to fresh leaves. Where the squash-bugs are numerous they become very destructive. Their eggs are not all laid at one time, and being hatched in successive broods, they are found in various stages of growth during the summer. During September and October they appear in their perfect state, that is, they get their wings and wing-covers. In color they are then rusty-black above and dirty ochre-yellow beneath. Their odor is that of an "over-ripe" pear, but more repulsive. Squash-bugs must be destroyed before they have laid their eggs. This is easily done by hand picking. If it has been omitted, the patches of eggs and clusters of young bugs must be crushed between the thumb and forefinger.

II. INSECTS INJURIOUS TO ROOT CROPS AND INDIAN CORN. **The Corn-worm, Boll-worm** (*Heliothis armigera*).—Although the corn-worm feeds on corn and the boll-worm on cotton bolls, they are identically the same insect, producing exactly the same species of moth. It attacks corn in the ear, at first feeding on the "silk," but afterwards devouring the kernels at the top end, being securely sheltered the while within the husk. But they generally disappear when the corn fully ripens. Besides ravaging corn and cotton crops this glutinous worm eats itself into tomatoes, young pumpkins, and various green fruit, causing such fruit to rot. [Fig. 7.] It also eats green peas and beans. In 1860—the year of the great drouth in Kansas—the crop in that State was mostly ruined by the corn-worm. In color the young worms are from pale-green to dark-brown. The body has longitudinal light and dark lines and is covered with black spots which give rise to soft hairs. When full-grown the worm descends into the ground, and there forms an oval

cocoon of earth interwoven with silk, wherein it changes to a bright chestnut-brown chrysalis. After 3-4 weeks the moth makes its escape. In this last and perfect state the front wings are clay-yellow, marked and variegated with olive and yellowish brown, a dark spot near the middle of each wing being conspicuous. The hind wings are paler and have a dark brown band at the edge. [Fig. 8.]

The only remedy when the corn-worms infest corn is to kill them by hand. Their presence can be detected in the corn fields by the silk becoming prematurely dry and partly eaten.

The White Grub, June Bug (Lachnosterna fusca).— Few people are aware that the frequent White Grub and the familiar May-bug or June-bug are

different forms of the same insect. These beetles come often into the lighted rooms in May and June, buzz about and knock themselves against the walls [Fig. 9a]. Vast swarms of them are outside upon the trees. They are very voracious, and therefore destructive to trees and shrubs, sometimes completely denuding them of their foliage. They attack fruit-trees and ornamental trees alike, but always only at night. The beetle is an inch long, has long and slender legs and sharp claws, by which it can hold to the foliage. It is of a dark chestnut color and finely punctured.

Soon after pairing the female bug deposits from 40 to 50 eggs in the ground, and soon dies. The eggs hatch in a month. The young grubs subsist



(1)



(2)



(4)



(5)



(6)



(10)



(15)



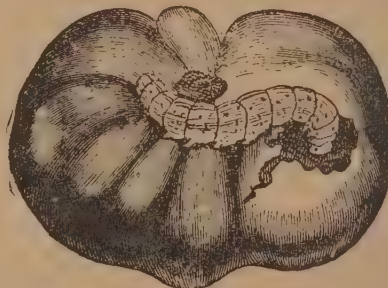
(12)



(15)



(3)

(7) BOLL WORM (*Heliothis armigera*) FEEDING UPON TOMATO.

(9a) JUNE BUG.



(9b) WHITE GRUB.

on small roots for two years. They cut them off below the surface, and the plant wilts and dies. This happens to Indian corn, to grass, to tender lettuce in the garden, to strawberries, potatoes, and all kinds of flowering plants. When two years old, this grub is as large as one's little finger. [Fig. 9b.] It is soft, dirty-white, and has a mahogany colored head. It is usually found with its body curved in a semi-circle, though it can straighten itself out and crawl slowly. In the third year the May-bugs form an egg-shaped chamber by sticking particles of earth together with an adhesive fluid. In this they pass their pupa state. In June of the same year the change into the perfect beetle is completed.

An insect related to the June-bug is known in England as cockchafer and in France as *Hanneton*. The French government has offered a prize for a remedy against it.

The best destroyer of this insect is the crow. The skunk also kills large numbers of them. In some parts of Europe children follow the plow and pick the larvæ up as they are exposed. The perfect beetles are often shaken from the trees into sheets and collected by pailfuls. This must be done in the early morning, when they do not attempt to fly.

The Potato-stalk Weevil (Baridius trinotatus).— This insect is abundant in the southern parts of Illinois,

Indiana and Missouri. [Fig. 10.] The female deposits an egg in a slit made in a potato stalk with its beak. The larva, after being hatched, bores into the heart of the stalk, and then works itself down towards the root. After passing through the pupa state within the stalk it comes forth in the beetle state at the end of August. The stalk inhabited by the larva always wilts and generally dies. The perfect beetle must live through the winter to reproduce its species in the following spring. In many potato-fields the vines become prematurely decayed by the ravages of the insect, and look as if they had been scalded.

The Potato-worm or Tomato-worm (*Sphinx quinquemaculata*). This is a large green caterpillar with a kind of thorn or horn upon its tail, and oblique whitish stripes on the sides of the body. [Fig. 20.] It devours the leaves of the potato to the injury of the plant. It grows to the thickness of the fore-finger and the length of three inches. At the beginning of September it crawls down the stem of the plant

and buries itself in the ground. Here in a few days it throws off its caterpillar-skin, and becomes a chrysalis of a bright brown color, with a long and slender tongue-case bent over from the head, so as to touch the breast only at the end, and somewhat resembling the handle of a pitcher. [Fig. 21.] In the following summer the chrysalis-skin bursts open, a large moth crawls out of it, mounts upon some neighboring plant, and in the evening it flies around in search of food. This large insect measures 5 inches across its spread wings, is of gray color with blackish lines and bands, and has five round orange-colored spots on each side of the body, for which the English entomologists call it the "Five-spotted Sphinx." Its tongue can be unrolled to the length of 5 or 6 inches; but when not in use is coiled like a watch-spring. [Fig. 22.]

The Colorado Potato Beetle (*Doryphora decemlineata*). Mr. Thomas Say, the zoölogist of the Government expedition to the Northwest Territories in 1819 and 1820, found numerous specimens of



(9) a, LARVA; b, MOTHS, WINGS OPEN; c, MOTHS, WINGS CLOSED.



(19)



(13)



(17)



(17)



(16)



(14)

a beetle on the Upper Missouri, near the base of the Rocky Mountains. It fed on a wild species of *Solanum* (*S. rostratum*), a plant belonging to the same genus as the cultivated potato (*Solanum tuberosum*). These beetles spread eastwards at the rate of 60 to 75 miles each year, after they once found food in the potato fields of Colorado, Kansas, Missouri, Iowa, Nebraska and Illinois. They increased so enormously as to become the greatest pest that ever afflicted western farmers.

The female beetles deposit their eggs on the under side of the potato leaves, in clusters of from 20 to 50, or more. They are orange-colored, and hatch in a week after being laid. The grubs feed on the leaves till fully grown. Then they bury themselves in the ground, and after ten days come forth as perfect winged insects. Two to four broods are perfected during the summer. The last brood descends into the ground in the beetle state and remains dormant during winter, reappearing in the next spring to devour the first shoots of the potato plants. In the larvæ of the potato-beetle the sides

are ornamented with two rows of black dots, and the head is black. The perfect beetle has ten black stripes on its front wings, which give it the name of the "10-lineata."

To destroy this insect, some kill the females as they come out of the ground in spring; others destroy the larvæ a few days later, when they have commenced feeding upon the leaves. This is done by dusting Paris green or other arsenical poisons, mixed with powdered plaster or flour, over the potato plants while wet with dew or rain. The operator must be careful not to inhale any of these poisons while at work.

III. INSECTS INJURIOUS TO THE CEREAL GRAINS AND GRASS CROPS.—The Chinch Bug (*Lygæus leucopterus*). The mature chinch-bug is $\frac{1}{2}$ of an inch long, has white wing-covers with a large black spot [Fig. 12]. The rest of the body is black and downy. It lives in most of our states. Such chinch-bugs as survive the autumn pass the winter as perfect insects in some hiding place, as under dead leaves, rubbish, straw, etc., in the usual torpid state. In

the spring the female lays its eggs, about 500, in the ground, generally upon the roots of plants. The larvæ, after they hatch out, remain under ground for some time, sucking the sap from the roots. The roots of wheat plants in a field infested with chinch-bugs have large clusters of these larvæ sticking to them. They look like so many moving little red atoms.

The chinch-bugs infest dry loose ground in the Southern and Southwestern States. They travel in immense solid columns from field to field, like locusts, destroying everything as they proceed, but especially corn and wheat fields. They sometimes cover the roads, fences, teams, workmen—pass through houses, corn-cribs, orchards, meadows—one creeping mass of stinking life, like the lice-pest in Egypt. But they are generally gone after a few days.

A simple and cheap method of treating this pest has been devised by Wilson Phelps, of Crete, Ill. It is this: With twelve bushels of spring wheat mix

one bushel of winter rye, and sow in the usual manner. The rye not heading out, but spreading out close to the ground, the bugs content themselves with eating it until the wheat is too far advanced to be injured by them.

The Hessian Fly (*cidomyia destructor*) [Fig 13].—This insect obtained its name from the supposition that the Hessian troops in the British service had brought it here. As no such fly can be found in Germany or any other part of Europe, this supposition must be erroneous. The Hessian fly has two broods, one is hatched in May, the other in September. Its eggs are laid in the creases of the leaves of young wheat. The maggots, or larvæ, crawl down to the sheathing base of the leaves, and remain between the base of the leaves and the stem, causing the stalks to swell [Fig. 14] and the plants to turn yellow and die. They suck the sap of the stalks. During their first winter they are in the pupa state, looking like flaxseed.

The head, antennæ, and thorax of the Hessian



(22) MOTH.

fly are black, the wings dull smoky brown, and the legs are pale brown. Its spread of wing is only about $\frac{1}{2}$ inch. As precautions against this insect, pasturing the wheat-fields with sheep in November, and rolling the ground have been recommended, in order to kill the eggs and larvæ; also the use of lime, soot, or salt, scattered over the young wheat. The Hessian fly infests the Eastern, Atlantic and Middle States, and the Valley of the Mississippi River.

The Army-Worm is the larva of a night-flying moth (*Leucania unipuncta*). The perfect insect is plain and unadorned in appearance [Fig. 15], of a yellowish-drab color, with a white spot in the center of its fore-wings; and it has a spread of wings of $1\frac{1}{4}$ inches. The eggs are laid in the spring of the year between the folded sides of grass blades, and glued along the creases with a white, glistening, and adhesive fluid, which draws the two sides of the blades close around them. The worms hatch out in ten days. They are dark-gray, with three narrow yellowish stripes above and a broader one on

each side. When fully grown, the army worm measures from $1\frac{1}{4}$ to 2 inches, and is about as thick as a goose-quill. Its chrysalis is of a mahogany-brown color, $\frac{3}{4}$ inch in length, and tipped at the end with a short spine. [Fig. 16].

Sometimes the army-worm becomes very numerous and destructive. This occurs at the time when winter wheat is in the milk, and again in August. The easiest way to arrest its ravages is by plowing a double furrow around the field. This furrow must be deep and have the steep side next to the unharmed crop. A ditch with the side toward a field perpendicular is still better. When the worms are collected in the ditch, cover them with straw and burn it.

IV. INSECTS INJURIOUS TO FRUIT TREES.—The apple-tree borer (*Saperda bivittata*) causes the apple-trees on the ridges to be shorter lived than those grown on our lower lands. It is a native American insect [Fig. 17], and has for ages inhabited our crab-apple trees. It also attacks the quinces, mountain-ash, hawthorn, pear, and June-berry, and

does a great deal of damage to orchards in various localities, but especially in New England and the Middle States. The borer is the larva of the insect. When fully grown it is about an inch long, and the first segment a quarter of an inch thick. Its color is light-yellow; but the head is chestnut-brown, polished and horny, and the jaws are deep-black. The perfect beetle comes forth from the trunks of the trees at night, early in June, and moves and flies about in search of companions and food.

Notwithstanding the pains that have been taken to destroy and exterminate these pernicious borers, they continue to reappear in our orchards and nurseries year after year. They can be killed by thrusting a wire into the hole made by them; also by cutting the grub out with a knife or gouge. But these are slow ways, because the borer always penetrates into the hearts of the trees, and such means are not better than locking a stable after the horse has been stolen from it. As the female beetle will not lay her eggs upon trees protected by alkaline washes, a good preventive is found in applying soft soap mixed with the lye from wood ashes, thinned with water, to the base of the tree. The wash need not reach up to the crotch of the tree, because the borer is rarely found as high up as that. But if a piece of lye soap is placed in the crotch, the rains will produce the necessary wash.



(18) APPLE WORM—CODLING MOTH.

V. INSECTS INJURIOUS TO SMALL FRUITS.—*The Grape Phylloxera* (*Phylloxera vastatrix*). This minute insect is a native of America, but it has wrought its greatest mischief in Europe. There are two types of it: The Leaf-gall type (*Gallicola*), which produces galls on the underside of the leaves of the grape-vines; and the root-inhabiting type (*Radicola*), which hides in the creases, sutures and depressions of the roots. The *Gallicola* lives in the leaf-galls, which are of the size of a pear, while she surrounds herself with eggs scarcely $\frac{1}{16}$ inch long and less than half as thick. The mother-louse is only $\frac{1}{16}$ inch long, nearly spherical in shape, of a dull orange color, and looks much like an unripe purslane seed. Having exceedingly small limbs and a round body she looks clumsy, and as if she were swollen. The eggs she lays hatch into little oval lice of a bright yellow color. Issuing from the mouth of the gall, the young ones scatter over the vine, most of them finding their way to the tender terminal leaves, from which they suck out the sap. Each young louse produces a gall for its habitation. In this new home she begins a parthenogenetic maternity by the deposition of fertile eggs as her parent had done before. She increases in bulk with pregnancy, and one egg follows another in quick succession until the gall is crowded.

The mother dies, and the young, as they hatch, issue and produce new galls. The number of eggs in each gall is from 200 to 500. The family is wonderfully prolific. As there are at least five generations in a season, these lice cover the leaves with their galls completely till fall. The consequence is that the vine loses its leaves prematurely. Before the end of September the young lice attach themselves to the roots of the vine, and thus they hibernates. The male gall-louse is not known, perhaps it does not exist.

The *Radicola* is in its first larva state like the *Gallicola*. But, instead of the smooth skin, it soon



(20) CATERPILLAR.

acquires raised warts or tubercles, and retains a more elongated form than the *Gallicola*. Neither of them get wings, and both are occupied, from adolescence till death, with the laying of eggs. The eggs of the *Gallicola* are, however, smaller and more numerous than those of the *Radicola*. With pregnancy the *Radicola* becomes quite tumid and pear-shaped, and it remains with scarcely any motion in the quite secluded parts of the roots, such as creases, sutures, and depressions between the knots.

For a winged female *Phylloxera*, which seems to be different from those hereinbefore described, see *Britannica*, Vol. XXIV, p. 239.

The result of the punctures made by the root-louse is an abnormal swelling beginning at the tips of the rootlets. These swollen tips soon rot, when the lice attack fresh roots. At last the entire system of small roots wastes away. The only practicable way of combating this insect is by drowning it. For this purpose the soil is irrigated. Another way of evading its ravages is to graft the vines upon stocks, the roots of which are *Phylloxera*-proof. To this end American varieties have been sent to Europe in large numbers, both as cuttings and as rooted plants. An enterprising grape-growing firm has even established nurseries in Europe for the production of American vines that resist the *Phylloxera*.

Locusts (*Locustæ*), often called *Grasshoppers*. (Fig. 19.) The *Rocky Mountain Locust* is at home on the plains between the Mississippi River and the Rocky Mountains where it is hot and dry. There they breed and multiply. When they have reached a certain stage of their existence they take



(21) CHRYSALIS.

to flight, and come, generally with the prevailing wind, eastward in countless millions. They overrun Kansas, Missouri, Nebraska, Iowa, etc., and eat every green thing they meet. When the season comes for depositing their eggs, the swarms which happen to be in favorable localities, such as sandy sunny hillsides, proceed to do so, after which most of them soon die, and the pest disappears. If the succeeding winter is mild the young grasshoppers will appear next spring in great swarms with the earli-

est vegetation. At this time they are the most destructive, because one young grasshopper eats as much as a dozen old ones. They feed voraciously. After attaining their full growth, they take to flight, as did the generation before them. This happens generally in August. But the grasshopper years are, happily, far between.

Various methods are used for combating the attacks of the locusts. Their eggs are destroyed by harrowing the ground, especially with revolving harrows, in autumn and early winter; also by plowing and irrigating. Broad pans, similar to the scrapers used in roadmaking, are covered with coal-tar or crude petroleum, and placed across the fields infested by locusts. On approaching, the latter jump into the oil and die there. In places where straw is plenty, it is placed in windrows and burnt on the approach of the locust swarms. To stop the young insects, ditching and trenching is effectual. The ditches must be at least 2 feet wide and 2 feet deep, and have perpendicular sides. The young locusts tumble into such ditches and die at the bottom in large numbers. Where lumber is cheap, a board-fence 2 feet high is an effectual barrier, if a 3-inch batten is nailed horizontally over the top and the edge at the side from which the locusts are coming is smeared with tar. The destruction of the winged insects, when they swoop down upon a country in prodigious swarms, is immense. Man is powerless in the presence of the mighty host.

On the subject of beneficial insects, as the *Honey-bees*, and the various insects that destroy harmful ones, as the *Lion-beetles*, which devour the Cut-worms; the *Lady-bugs*, which eat the Plant-lice (*Aphides*); the parasitic *Ichneumon-flies*, which deposit their eggs into Tomato-worms and other caterpillars, a great deal might be said. But we conclude this article by stating that most plants would disappear from the face of the earth if it were not for the countless insects which assist in their fertilization and cross-fertilization. Red-clover, for instance, planted in New Zealand, would thrive quite well as far as the single plants were concerned; but it could not be made to spread there because of the absence of humble-bees, which assist in cross-fertilizing it. Most countries would be entirely uninhabitable during the hot seasons if it were not for the countless millions of insects acting as scavengers by devouring putrefying vegetable and animal matters, and thereby making the air fit for breathing, whereas it would be directly poisonous without the action of these hated little scavengers.

INSESSORES or PERCHING BIRDS, an order of birds called by Cuvier passerine or "sparrow-like." The order includes more than half the known birds, but can hardly be defined, since the members are marked rather by a combination of characters than by any uniqueness.

INTERCONTINENTAL RAILWAY. A projected railway extending through Mexico, and the Central American States southward for the purpose of opening railway communication between the various American republics. In Dec., 1891, surveys were in progress for the connecting links of this railway, not only in Mexico but also at various other points along the route. Three surveying parties were at that time in the field under the direction of the Commission. Nearly 1,000 miles of the proposed road had already been surveyed including the most difficult part—that part through Ecuador and the southern part of Colombia. The report showed less engineering difficulties than had been anticipated.

The following abstract of the report of the

Commission was published in Washington, D. C., Jan. 6, 1892:

United States and Mexico.—The railways in these two countries being in perfect communication, the Commission has only been occupied with their continuation, and the choice of the most available point of departure; it has decided for Ayutla, on the Guatemala frontier.

Guatemala.—From Ayutla the Intercontinental line will descend by the Pacific Coast, passing in the neighborhood of Rotahuleu and Mazatonango, as far as Santa Lucia. Thence will be used the branch, in course of construction, of the Central Railway from Guatemala to Escuintla, and the road will pass from Cujinijilapa to Santa Ana, in the Republic of Salvador.

Salvador.—In this Republic the route of the proposed Central line will be utilized, passing by Santa Ana, Nuevo San Salvador, Cujetepeque, San Vincent and San Miguel, entering Honduras by Guascoran.

Honduras.—From Guascoran the line will continue by the shore of Gulf Fonseca, crossing the State of Chulutecca by way of the town of that name, going thence to the south toward Nicaragua.

Nicaragua.—In this republic the line will arrive at the town of Chinandega, where it will join the railway from Corinto to Lake Managua, utilizing this line up to an available point—for example, Pueblo, Viojo—skirting the lake and coming to the town of Managua, where it will take the line already constructed from Managua to Massaya. From Massaya the line will pass to Rivas, will cross the proposed Nicaragua Canal and will enter into the Republic of Costa Rica.

Costa Rica.—Following the shores of the Lake Nicaragua, and penetrating the country by the plains of Guatuso and San Carlos, the line will continue as far as the town of Alajuela, where there is a branch to the capital. From Alajuela a continuation will be made by the railway from San José to Puerto Limon, thence, by points which are not yet determined, the length of the Isthmus of Panama, as far as the entry of the Altrato Valley, in Colombia, will be traversed.

Colombia.—Colombia being reached, the Intercontinental will traverse the Western Cordillera of the Andes, entering into the Cauca Valley and reaching the environs of the town of Antioquia. It will ascend by this valley, connecting the principal localities met with, and arriving at Popayan. The Central Cordillera will be crossed, in order to survey the branch intended to connect Bogota with the main line. From Popayan the line will pass into the Patia Valley, making toward Pasto or Ipiales, with continuation toward Ecuador. The passage of the Cordillera on the route from Popayan to Pasto will be one of the greatest difficulties met with in Colombia; it is at this point that the great ramifications of the Colombian Andes begin.

Venezuela.—In order to place this Republic in communication with the trunk line, a branch will start from a point (still undetermined) of the route in the Cauca Valley, going to Medellin, where it will rejoin the line running from that town to Puerto Berrio, on the Magdalena. Thence it will go to Bubaramanga, and thence to San Jose de Cucua (frontier) with San Christobal, La Grita, Merida, Trugillo, Barquisimeto, in terminating at Valencia. From Valencia to Caracas, by way of La Victoria, a railway is in course of construction, and will be completed in a few years. Other lines having been conceded, are being surveyed in the regions just indicated. The route of the Intercontinental will undoubtedly adapt itself to circum-

stances at the time of the execution of the project, whenever that may be.

Ecuador—The line will touch at the town of Tulcan, then, descending by the central valley of Quito, will serve the towns of Ibarra, Quito, Latacunga, Ambato, Cuenca and Loja, entering Peru.

Peru—The line will traverse the Department of Cajamarca, or the Amazonas, till it meets the River Marañon, and will ascend by that valley as far as Carro de Pasco. From the latter point it will follow the course of the Perene up to a proper point for a deviation to Santa Ana, then to Cuzco, Santa Ana; then to Cuzco, Santa Rosa and Puno, skirting Lake Titicaca in order to penetrate Bolivia.

Bolivia—The Intercontinental will connect the towns of La Paz, Oruro and Huanchaca, where it will divide into several branches, going to Chili, the Argentine Republic, Brazil, Paraguay and Uruguay.

Chili—The Chilean branch goes from Huanchaca to Antofagasta, a port on the Pacific.

Argentine Republic—This branch, which has already been surveyed, goes from Huanchaca to Jujuy, the extreme point of the railway system of this Republic.

Paraguay and Uruguay—The line which is to connect these two countries to the proposed system will start from Huanchaca, will follow the left bank of the Pilcomayo, in order to rejoin the Osborn concession, which, from Asuncion, goes to north of Paraguay. From Asuncion, use will be made of the lines already constructed or in course of construction, as far as Montevideo.

Brazil—The Brazilian branch starts from Huanchaca, going eastward, clearing the Paraguay River at Curuna, where, penetrating Brazilian territory, it follows the River Taguary as far as Coxim. A railway, if the concession for it shall be granted, will go from this point to Urberaba. From this latter locality the existing lines continue to Rio de Janeiro.

The scientific commissions are authorized to search out and survey the best directions and routes. The above plan must only be considered as a general idea, which according to the plans drawn up at the Washington Central Bureau, would appear to serve most effectually the interests of the American republics.

INTERNATIONAL LAW. For the scope and maintenance of PUBLIC INTERNATIONAL LAW, see *Britannica*, Vol. XIII, pp. 190-197. We speak here exclusively of PRIVATE INTERNATIONAL LAW. Here the questions arise: If a marriage is valid in the state A, is it also valid in the state B? If a child is legitimate in A, is it also legitimate in B? If a will made in A is valid there, is it also valid in B? If by the laws of A the property of a deceased person (the property lying in the state of B) passes to certain heirs, does it also pass to them by the laws of B? Such questions are determined by private international law. The subjects of this branch of jurisprudence are private individuals, and its rules are administered by municipal courts. Its doctrines resolve themselves into the doctrine of jurisdiction and nothing more. It determines no legal relations whatever.

Formerly, the private international law was based on the famous rule of Foelix and Auber, that all the effects which foreign laws can produce within the territory of any nation depend absolutely on the consent of that nation, either express or tacit. This rule has been abandoned by the majority of noted jurists, and in 1874 it was formally repudiated by the Institute of International Law at Geneva. The whole principle of this branch of law is

a direct corollary, or inference, from the doctrine of "Recognition." We recognize a foreign state as a sovereign and an equal, and the comity, or courtesy, between nations (*comitas gentium*) involves our duty to enforce the definitions which that state has imposed on legal relations. This rule holds good even when the definitions so imposed differ from those that are applied to the same legal relations when existing among our own citizens. Private international law rests, therefore, not upon the definition of the laws ruling in the recognizing state, but entirely upon the principles ruling in the recognized state; provided, there is nothing in these principles that contravenes the domestic policy of the latter state.

The increasing intercourse between individuals of different nations gives a growing importance to this branch of law, the rules being enforced by the various states as parts of their local laws. The rights to real property are, however, regulated by the law of the country wherein such property is situated. This *lex loci rei sitæ*, as it is called, governs the tenure, title, descent of such property, the questions relating to letting, hiring, mortgaging, public burdens, taxation, etc., whether it belongs to an alien proprietor or a citizen. In most states of Europe, and in all American States, real and personal property of every description may now be acquired, held, and disposed of by an alien in the same manner as by a citizen of the State; and a title to real and personal property of every description may now be derived through, from, or in succession to an alien, in the same manner as through from, or in succession to a citizen of the State.

I. MARRIAGE falls under the private international law. In this country the prevailing rule is, that no specific form of solemnizing marriage is required to its validity. If two persons competent to marry consent to it and accept each other as husband and wife before witnesses, there is a valid marriage. No license, magistrate, or clergyman is necessary for its validity. But in Massachusetts and Rhode Island a license must be taken out, and a magistrate or a domiciled minister of a religious denomination must solemnize it, else it is held to be invalid. Similar rules are enforced in all European states. Now, the private international law makes it obligatory to acknowledge as valid any marriage performed in another State, if the same is valid in the latter State, even if no clergyman or magistrate has officiated at its solemnization.

II. DIVORCES *a mensa et foro* are not granted in the United States, though in some States married women can obtain decrees of court permitting them to act independently as *feme sole traders*. In all our States divorces *a vinculo matrimonii* are granted for adultery, cruelty, and desertion. But in some of the States the petitioner must reside there for six months, and in others for twelve months. In cases of desertion, the supreme court of Pennsylvania holds, that the petitioner can only sue in the State where the deserted party is domiciled. In most of the States it is now held that no divorce is extra-territorially valid unless granted by a State in which the petitioner was domiciled in accordance with the rules of international law. If only the petitioner is domiciled in the adjudicating State, and the defendant's residence is known to the plaintiff, there must be personal notice given to the defendant. But this rule is not yet universal.

III. DOMICIL is the legal conception of residence. A mere transient residence is no domicile; nor is a place selected for exceptional business purposes. There must be an intention to remain (*animus manendi*) in the particular place as a fixed abode, or

permanent home. The law of domicile determines the questions of personal status, legitimacy, marital rights, and succession to personal property. The place which a man selects as his permanent home properly supplies the law by which the legitimacy of his children is regulated, his personal status is determined, his taxes to the government are fixed, and by which the distribution of his personal estate is made.

IV. The law of domicile also regulates the validity and interpretation of CONTRACTS. The law of the State in which a contract was entered into (*lex loci contractus*), determines the validity of the contract anywhere else, provided that the State where it is to be enforced, or where suit is brought does not declare its performance illegal in the place specified by the contract. If, for instance, suit is brought in the State of Rhode Island for the price of spirituous liquor to be delivered in New York, where such delivery is lawful, the Rhode Island courts will sustain such suit, although it would be unlawful to deliver spirituous liquor in Rhode Island.

V. Although the Succession to the real estates of deceased persons is governed by the *lex situs*, their personal property descends according to the *lex domicilii*, even if it is scattered over the whole civilized world. All the American and European states unite on this rule.

VI. In regard to CRIMINAL LAW, it is held, that the State in which a supposed offender is arrested, has jurisdiction over the offence. This so-called "cosmopolitan" theory is based on the assumption that each sovereign has the right to punish offenders for past misdeeds; but it is limited to offenses against his own country only. Numerous statutes have been passed by Congress making it an offense to forge, in a foreign country, United States securities and notes, and to take false oaths before United States consuls, and many convictions have been had under these statutes. We have also had many rulings that the State where an offense takes effect, has jurisdiction to punish the offender. If, for instance, a conspiracy is organized in Canada for the purpose of cheating parties in New York by letter, and the conspiracy is carried into effect in New York, then New York has jurisdiction over the offense, and can try the offenders, if found within her boundaries. If a shot is fired on the Mexican side of the boundary line between Mexico and Texas, and a man is killed by this shot, the offender can be prosecuted in Texas, if caught there. The place of consummation has jurisdiction over such and similar crimes. Were this not so, there is not a home that would be safe from explosive machines and other missiles sent by express from other places; business men would be daily exposed to the machinations of foreign swindlers; public and corporation securities would be forged abroad with impunity; imported goods would be entered in the custom houses under false affidavits, etc. With the present facilities for travel the right to punish for offenses operating in one State but concocted abroad, would be seriously impaired, if it were not for the "extradition," or surrender, of alleged criminals by one State to another. Adroit offenders would defy the laws by escaping to foreign lands, where they would be secure. Extradition is now made obligatory by treaties between all civilized countries. For extraditing an alleged offender the crime must be distinctly specified; it must be a common crime, not one of a political nature (except regicide); there must be a probable cause of guilt, such as would justify the finding of a bill by a grand jury; and the surrender must not be made to a State in which punishments are inflicted arbitrarily and capriciously.

INTER-OCEANIC CANAL, THE. In Britannica, Vol. XVIII, pp. 208, 209, will be found a description of the Isthmus of Panama, with an account of the difficulties to be overcome in constructing the proposed ship canal to connect the Atlantic and Pacific oceans at that point, and of the contemplated measures for accomplishing the work. M. De Lesseps's first estimate of the entire cost of the work was 658,000,000 francs; he afterwards reduced this estimate to 600,000,000, and upon opening his subscription lists twice as many shares as he deemed necessary were subscribed for in a short time. He announced that the canal would be opened to the traffic of the world in 1888. Soon after actual work had been begun, in 1881, it was found that the cost would rise above the estimated amount. Excavations were made at several points along the line. A very large plant of machinery was sent to the isthmus, and the preparations, in workshops, hospitals, means of transportation, etc., were designed for a vigorous prosecution of the work. The digging proceeded with more or less vigor till May, 1885. At that time the engineers reported to have excavated $12\frac{1}{2}$ millions of cubic meters out of a total of 125 millions of cubic meters required to be dug in order to complete the canal. The tide-lock, the breakwater at Aspinwall and the excavations in the Bay of Panama had not yet been commenced. The money expended up to that time exceeded 500 millions of francs and the obligations contracted amounted to over 766 millions, on which the company had to pay $30\frac{1}{2}$ millions of francs yearly interest. From May till the end of 1885 very little progress was made in the work, because the Chagres River inundated a large portion of the district and caused a great deal of damage. A disastrous storm occurred also in the Bay of Aspinwall in December, 1885.

After this it became more and more difficult for the company to raise the necessary funds for the prosecution of the work. Still it went on, with some interruptions, till March, 1889. The cost was enormous. In December, 1888, the actual outlay had already exceeded the sum of 1,000 millions of francs = \$200,000,000. Still De Lesseps was hopeful. When asked by the then German Crown Prince Frederick where the money for the completion of the canal was to come from, he answered airily: "From the woolen stockings of the French people," alluding to the custom of French workmen, peasants and tradespeople, storing their small weekly savings in stockings. He asked the government to sanction a lottery for the raising of the money. It was refused. Although the public authorities favored his last effort to obtain further subscriptions from the French people, it failed entirely. Only a guaranty by the government could put his scheme on a sure basis, and this the French government was bound not to give.

Work ceased in 1889 for lack of funds and the whole enterprise is now in the hands of a liquidator appointed by the government. A commission of French engineers has made a general survey of the isthmus, the condition of affairs and the state of the work. This commission has sent in a very unfavorable report, which was laid before the French Chamber of Deputies. According to this report the construction of the canal at the calculated level would cost 1,737 millions of francs = \$347,400,000, and the work could only be completed on the basis of an international agreement or a syndicate of the states interested. The report further states that, taking into account the interest to be paid during so long a period without any receipts, and also the general financial charges, the capital necessary for the completion of the canal must be es-

timated at three millions of francs, or, say, \$600,000,000.

The shareholders of the canal company, becoming convinced that the funds subscribed had been improperly administered, petitioned the French Chambers, asking that the liquidator should prepare a statement showing what had been done with the money received by M. de Lesseps and his directors. This petition eventuated in the presentment of formal criminal indictments, and a gigantic conspiracy, involving not alone the chief promoters of the Panama Canal enterprise, but some of their agents in the United States, was exposed. In this investigation the world was to witness the tarnishing of splendid names and the downfall of men whose careers had long been synonymous for French glory and advancement. It was to witness the demolition of reputations which had acquired an international scope by the splendor of gigantic achievements; and while the faith of many in the rectitude of the venerable hero of Suez remains unshaken, yet the criminal mismanagement of the Panama enterprise will forever remain a blot upon the career of the brilliant Frenchman. (See DE LESSEPS in these Revisions and Additions).

INTERSTATE COMMERCE LAW OF THE UNITED STATES. On April 5, 1887, an act of Congress became effective, bearing the title "An act to Regulate Commerce." Its authority rests upon the constitutional provision which confers upon Congress the power to regulate commerce among the several States. This law was a new departure in Federal legislation, because up to 1887 there was no governmental supervision of railway construction. Each State and Territory authorized the building of new lines, and by their consolidation with existing railroads the State lines were often entirely disregarded. The charters of the roads usually contained a clause authorizing them to fix their rates and fares, and the States relied solely on the influence of competing lines to keep rates and fares within proper limits.

But very soon competition bred discrimination, unjust partiality. A great deal of wrangling and litigation ensued, until the country was surprised in 1886 by a decision of the United States Supreme Court in the case of the Wabash Railway Company vs. the State of Illinois, which declared that a State law against discrimination was not valid in respect to "interstate shipments." Upon the heels of this decision the report of the Select Committee on Interstate Commerce came up for consideration in the Senate. This report complained bitterly against the discriminations practiced by the railroads all over the United States. Large shippers had private rates, rebates, free passes, and enjoyed various other 'concessions, generally kept secret. Small shippers and the public at large did not enjoy these favors.

The Select Committee recommended a bill forbidding all unjust discriminations under pains and penalties. This was the essence of the interstate commerce law. Its weak point was that it did not regulate competition nor restrict its excesses. The law as it first passed in the Senate imposed upon interstate carriers the three obligations of just and reasonable rates, the avoidance of all unjust discrimination, and the cessation of undue preferences or advantages. Thus far it was good. But the House of Representatives insisted on stamping out the evils of competition, and passed an amended bill which radically changed the proposed enactment of the Senate. In the closing days of the session of the Forty-ninth Congress an agreement was patched up between the two houses which resulted in the present "Act to Regulate Com-

merce." The two principal features grafted upon it by the House are on the "short-haul" clause, and the "anti-pooling" clause. The short-haul rule requires that rates at intermediate points shall be shrunk whenever competition forces lower rates at more distant points on the same line. Another beneficial rule demands that any rate made to one shipper must be granted to all and must for this purpose be published and open. The anti-pooling clause is especially severe against the pooling of freight, providing a fine of \$5,000 for the offense, counting each day the pooling agreement continues as a separate offense.

In 1887 and 1888, many small roads found that a great portion of their former traffic flowed to the direct and larger lines, which could give better service. Business was leaving them. As the "rebates," "drawbacks," and "other devices," by which they formerly secured traffic, were now forbidden, these roads resorted to the payment of "commissions" to a friend of the shippers, also to the payments of rent, clerk hire, dock charges, elevator fees, drayage, free transportation within a single State, and many other specious forms of evading the plain spirit of the law. Rates upon interstate traffic are usually "joint." It was soon found that, although the law requires the exact maintenance of the tariffs of each road, this important provision had been omitted to apply to "joint tariffs" in which two or more roads participate. Large shippers were prompt to strike for every advantage which they could obtain; to inform other lines of the favors offered them by this or that road for their patronage, thus playing one road against the other; and generally received the benefit of the violation of the law by one ingenious device or another. Therefore, Congress passed amendments to the law by which shippers as well as carriers were made subject to its penalties, and the punishment of imprisonment was added to the fine in cases of unjust discrimination. Joint tariffs were also distinctly brought within the jurisdiction of the Interstate Commerce Commission. These amendments became effective March 2, 1889, and their influence was felt immediately. Illegitimate methods of securing business ceased almost entirely.

But in 1890, the spirit of obedience relaxed; the law was secretly evaded in many cases; shippers again clamored for favors under the term of "relief," and no prosecutions were commenced. It soon became a common statement among shippers and freight agents that the interstate commerce law was, after all, a dead letter, and that its penalties need not be feared. Irregularities existed, but were carefully concealed. In a few cases, however, freight agents were indicted by grand juries and fined, and some shippers were also indicted and fined for fraudulent practices. But the railway officials, as a final resort, refused to testify before grand juries upon the plea that by so doing they would incriminate themselves or their companies. This point was held by the local courts not to be well taken; but it is now pending before the United States Supreme Court for review.

At the commencement of 1891, a number of roads west of Chicago and the Mississippi River associated themselves for the purpose of cutting down, by concerted action, the cutting of freight rates. These lines appear to be determined to obey the law, and it is only fair to state here, that in the Southern States there has been little complaint with regard to unjust discriminations between large and small shippers, and none with regard to the maintenance of the tariff rates for all. The difficulty in our Eastern, Central, and Western States arises from the multiplicity of lines, many of which would find

themselves impoverished by that strict maintenance of rates which is the most important requirement of the public.

The "railway pool," as it formerly existed, was an agreement by which at stated periods, the common business of competing lines was aggregated and apportioned upon agreed percentages, the lines in excess paying over to the lines in deficit such sums of money as were required to produce the necessary equalization among the shares of traffic assigned to the several roads. This custom exists in England to-day. Our interstate commerce law has abolished it at short order. No railway pools exist now in the United States.

Most railroads charged greater proportionate rates upon a shorter than upon a longer haul on the same line of transportation. This was abolished by the "short-haul" section of the law. It overturned customs, rate-sheets, and classifications of long standing in every part of the land, and involved a great loss of revenue to the roads. But it was generally submitted to by the companies, in spite of being felt as a grievous burden. Soon, however, it was found that this section of the law is limited by the words "under substantially similar circumstances and conditions." These "conditions" were held to include other carriers not subject to this law, with which the interstate roads had to compete. The commission therefore ruled that, if in cases of actual competition other carriers not subject to the law, as carriers by water or by roads confined to a single State, make a lesser charge for a longer than for a shorter haul, the interstate railroads are entitled to do the same under these particular conditions; and also in the rare and peculiar cases of competition with other railroads subject to the law where the general rule would be destructive of legitimate competition. The conclusion thus reached was generally accepted by the roads, and the section as thus constructed has been quite uniformly obeyed. Taking everything into consideration the interstate commerce law has had a beneficial effect and justifies the new line of Federal legislation fully.

INUNDATIONS: overflows of the land by the waters of streams and seas. The majority of the inundations are due to the sudden expansion of rivers beyond the confines of their banks and these are in some instances of annual occurrence. They are most likely to occur in the spring and midsummer, in the former case being superinduced by the melting of snows from the natural water-sheds, and in the latter by the violent precipitation of water from sudden rain storms. The result of these inundations is sometimes appalling in the widespread scope of the disasters they inflict upon the communities immediately affected. In China, where the Yellow River (Hong-ho) and the great Yangtse-Kiang frequently overflow, pouring vast bodies of water upon the contiguous country, thousands of lives have been sacrificed in recent years, and as these terrific inundations are almost invariably followed by widespread famines, and these in their turn by decimating fevers, they are justly viewed in the light of national calamities calling for the commiseration and the assistance of all enlightened peoples. The most disastrous of these floods occurred in the autumn of 1887, when the Yellow River broke through its southern embankment at Cheng-chow, drowning 9,000 laborers who were employed in strengthening the embankment. No less than 1,500 villages were submerged and a number of walled towns were destroyed. The estimates of lives lost vary from two to seven millions. More than \$10,000,000 were expended in a vain attempt to restore the river to its channel, and super-human

efforts were made by the Chinese government to mitigate the sufferings of the people, but in the famine which followed millions perished. The cause of this inundation, one of the most disastrous in the history of the world, was sought for and apparently discovered in the almost total deforestation of China. That wise and enlightened mandarin, Li-Hung-Chang, to whose sagacity Gen. U. S. Grant paid an admiring tribute after completing his tour of the world as "one of the greatest of living statesmen," issued a proclamation commanding the planting of trees by public officials and urgently appealing to the people to restore the forests of their country.

In the United States, apart from the appalling disaster at Johnstown (see **JOHNSTOWN** and **CONEMAUGH** in these Revisions and Additions), which was due to artificial causes, the element of floods has been of late years a prominent one in the roster of national calamities. In June, 1889, a disastrous flood occurred on the upper Potomac. Scores of villages were laid waste, and many thousand cattle were drowned. The Chesapeake and Ohio Canal was so seriously damaged by floating debris that months elapsed before navigation could be resumed, resulting in financial disaster to the canal company.

In May, 1889, a disastrous flood occurred in Western New York, and the city of Elmira was completely flooded, while merchandise was destroyed to the value of many thousand dollars. Several people lost their lives at Canisteo. In June of the same year extensive inundations took place in Pennsylvania, over an extensive region in the central and western part of the State. Close to Williamsport, on the left bank of the Susquehanna River, a great boom, containing 200,000,000 feet of logs and 40,000,000 feet of sawed lumber, was swept away, and many lives were lost. The damage wrought by this flood was estimated at \$40,000,000. In February, 1890, a disastrous overflow of the lower Mississippi occurred, submerging many villages and river towns and seriously impeding railroad transportation. While thousands of cattle perished and many people were rendered homeless, this inundation was fortunately attended with but small loss of life.

INVOLUCRE. In a shortened inflorescence, as the umbel, the bracts, unless suppressed, are necessarily close together, and form an apparent whorl around the group of pedicels. This is the involucre. In compound umbels the whorl of bracts of the secondary umbel is a secondary involucre, and is commonly called an involucrel.

IOLA, a city, railroad junction, and county-seat of Allen county, Kan., situated on Neosho River. The region is a fine agricultural locality and the city manufactures furniture and other goods. An artesian well supplies mineral water and natural gas heats and lights the town. Pop., 1,706.

IONIA, a city and county-seat of Ionia county, Mich., situated on Grand River. Agriculture and the lumber business are the leading industries. The place contains railroad repair-shops and various mills and factories. Population, 4,999.

IONIAN SEA, that part of the Mediterranean which lies between Greece and European Turkey on the east, and Italy and Sicily on the west. It forms the gulfs of Taranto and Patras, and communicates with the Adriatic Sea by the Strait of Otranto. It contains all the Ionian Islands except Cerigo.

IOWA AGRICULTURAL COLLEGE, THE, was established as a State institution in 1858, and bene-

fited by the land-grants made by Congress in 1862, to such States as had established or should establish colleges of agriculture and the mechanic arts. These land-grants formed the basis of the present endowment of the college—about \$650,000. The college is equipped with a farm of 900 acres, buildings costing about \$270,000, apparatus required by the courses of study, a library, and a museum containing large collections.

IOWA CITY, the county-seat of Johnson county, Iowa, and the capital of the State from 1839 to 1856, situated in Lucas township, on the east bank of the Iowa River, 120 miles east of Des Moines, and 54 miles west by north of Davenport. It is the seat of the Iowa State University, organized in 1860. It contains, besides many important public buildings, a large paper mill, a foundry, manufactories of carriages, alcohol, flour, beer, linseed oil, pumps, plows, etc. Population in 1880, 7,123; in 1890, 5,628.

IOWA COLLEGE. See COLLEGES, in these Reviews and Additions.

IOWA FALLS, a railroad junction of Hardin county, Iowa, on the Iowa River, the falls of which, at this point, give the name to the town. It is 143 miles west of Dubuque.

IOWA, one of the Northwestern States of the American Union. Its boundary lines are—on the south and north the parallels $40^{\circ} 36'$ and $43^{\circ} 30'$ of N. latitude, on the east the Mississippi River, and on the west the Missouri and Big Sioux Rivers. The southeastern corner projects slightly below the parallel of $40^{\circ} 36'$, the boundary following the Des Moines River down to its mouth. The neighboring States are Minnesota on the north, Wisconsin and Illinois on the east, Missouri on the south and Nebraska and South Dakota on the west. The length of the State from north to south is about 200 miles, and its greatest breadth from east to west 300 miles. Its area is 35,855,900 acres, or 56,025 square miles. The population of the State in 1893 was 1,911,896.

The general character of the State is prairie. On the valley of the Mississippi, which, with the Missouri, are the only navigable rivers, are bluffs ranging in height from 200 to 400 feet. The bottoms are wide and fertile. It is estimated that about 7,000 square miles are underlaid by the coal-measures. Within this area coal-beds of workable thickness and quality have been found at Fort Dodge, Moingona, Des Moines and Oskaloosa, where they are being extensively worked. The coal is bituminous, no anthracite having been found in the State. Immense capital is invested in this business and at least nine thousand five hundred are constantly employed, producing an annual output of coal alone valued at five and a half millions, and receiving annually in wages not less than four millions of dollars. The northeastern part of Iowa is included within the great lead region of the Upper Mississippi; and, although the palmy days of the mines of that region are over, the product is yet very important. The ore, which is galena, is found in pocket deposits in the lime-stones of the Silurian formation. These deposits vary immensely in size, and in general extend to no great depth, and therefore cannot be relied upon for permanence.

The manufacturing industries have not yet reached a high degree of development. Those branches connected with agriculture have naturally made most advance. For means of communication and transportation Iowa is dependent almost entirely upon its railroads and its two bounding rivers. It has no canals, if we except the short one around the Des Moines rapids.

During the period ending June 30, 1891, there was \$3,540,064.85 paid into the treasury on account of general revenue, making a total, after adding the balance on hand at the beginning of the period, July 1, 1889, viz., \$5,181.67, of \$3,545,246.52, available for current expenses. The disbursements from this fund for the same period, in the payment of auditor's warrants and interest thereon, amounted to \$3,057,187.57, leaving a balance in the treasury June 30, 1891, of \$488,058.95.

The equalized total value of real and personal property in the State, as fixed by the State Board of Equalization, for the year 1891, was \$630,695,141, and the total assessment of the State was \$531,368,526.

The State has a large number of institutions for higher instruction. It is also well supplied with institutions of an educational, charitable, quasi-charitable and reformatory nature. Among these may be mentioned the State University, a Normal School, Agricultural College, Soldiers' Orphans' Home, College for the Blind, Institution for the Deaf and Dumb, Institution for Feeble-Minded Children, three hospitals for the insane, two penitentiaries, two industrial schools, a Soldiers' Home, an Industrial Home for the Blind, a State Library and an Historical Society. The total expense to the State in the maintenance of these different institutions, for the biennial period ending June 30, 1891, was \$2,200,536, and since their establishment they have cost the State \$16,194,852.

In 1891 the railroads had 8,440 miles of track, and their property was assessed at \$44,798,174. The gross earnings for the year ending June 30, 1891, was \$14,463,106.

A remarkable growth of savings and State banks, during the biennial term ending June 30, 1891, is reported. The number of savings banks increased from fifty to eighty-three, and the deposits in same from \$13,125,058.88 to \$20,821,495.07, a gain of \$7,696,436.19, while the number of State banks increased from eighty to one hundred and twenty-two, and the deposits in same from \$7,271,515.22 to \$12,960,211.60, a gain of \$5,688,696.38, a total gain of seventy-five banks and \$13,385,127.07 in deposits, making the total deposits in the banks under the supervision of the auditor of State \$33,781,706.67.

One of the most momentous questions which has for some years been agitated in Iowa politics is the repeal, or at least the modification, of the existing prohibition statute. In 1882 the State adopted, by 155,436 votes, against 125,677, a constitutional amendment prohibiting the manufacture and sale of liquors, wine, and beer, but the Supreme Court decided that it had not been constitutionally adopted. In 1885 the legislature passed a prohibitive statute which is still in force. Public sentiment is much divided upon the question of its repeal. The open violation of the statute has been for some years notorious, and in the few instances where offenders have been brought to justice the government has been unsparingly censured for the penalties inflicted.

The views of the repeal party are so ably set forth by Horace Boies, the governor of the State, that we extract the following from his inaugural address delivered January 20, 1892:

"Among all the criminal statutes of Iowa there is one, and one alone, that is openly, notoriously, and continuously violated with the tacit, if not the publicly expressed consent of a vast majority of whole communities of our people, who are in every other respect as moral, as law-abiding and as desirable citizens as any within our State.

"And, so viewed, what has the law undertaken to accomplish?

"It has converted into flagrant crimes, acts that a vast majority of the best people of the whole civilized world regard as innocent.

"It has required for its enforcement the infliction of penalties that, compared with the acts for which they are imposed, would shock the conscience of the most barbarous ruler on the globe.

"It has invaded the domain of the most sacred of personal rights, and destroyed without mercy every form of individual property that stood in the way of its enforcement.

"It has entered the home of every citizen of the State. Made itself the guardian of his actions and dictated his conduct in matters strictly personal to himself, and for which he should be responsible to his Maker alone; for if enforced, there would not be in all this State one single place where any man or woman could purchase for use as a beverage one drop of intoxicating liquor of any name or kind.

"It has proved," concludes Governor Boies in this able document, "an obstacle to the material progress of Iowa of such magnitude that to-day, with a State the peer of any of her sisters, with her resources but half developed, we are compelled to witness a more rapid advancement than our own in the population of every State that adjoins us on either side."

IPSARA, or PSARA, a small island belonging to Turkey, in the Grecian Archipelago, 9 miles west of Scio. It was very prosperous before the Greek revolution; but, taken by the Turks in 1824, its industries fell into decay and its population diminished. Its inhabitants are chiefly engaged in fishing.

IPSWICH, a village of Essex county, Mass., on Ipswich River, 3 miles from the Atlantic, and 27 miles northeast of Boston. The town was settled in 1642, and was originally the county-seat. It has manufactories of silk, hosiery, shoes, isinglass, soap, and woolen fabrics. It contains the Manning high-school, the Heard public library, a house of correction and an insane asylum. Pop. (1890), 4,439.

IRBY, JOHN L. M., a United States Senator from South Carolina, a lawyer, born in Laurens county, South Carolina, Sept. 10, 1854. He was educated at the University of Virginia and Princeton College, and entered the profession of law in 1876. In politics he is a Democrat, and an active member of the Farmers' Alliance. He was elected a member of the State house of representatives in 1886, 1888 and 1890. In 1890 he was elected by the South Carolina legislature to the United States Senate, to succeed Wade Hampton.

IREDELL, JAMES (1750-99), an American jurist. He was admitted to the North Carolina bar in 1775, and from 1774 until the Revolution, was collector of customs at Edenton. In 1777 he was chosen a judge of the supreme court, and in 1787 was appointed a commissioner to compile and revise the laws of the State. In 1790 he became associate justice of the United States Supreme Court.

IREDELL, JAMES (1788-1853), a United States Senator, son of the preceding. He was admitted to the North Carolina bar, and in 1816 became a member of the legislature, serving for many years. In 1827 he became governor of the State, and from 1828 to 1831 was in the United States Senate. He afterwards practiced his profession in Raleigh, and for many years was reporter of the decisions of the supreme court. He published a *Treatise on the Law of Executors and Administrators*, and a *Digest of All the Reported Cases in the Courts of North Carolina*, 1778 to 1845.

IRELAND. See *Britannica*, Vol. XIII, pp. 214-72; also *GREAT BRITAIN*, in these Revisions.

IRELAND ISLAND, one of the Bermudas.

IRIDEÆ, or IRIDACEÆ, a natural order of endogenous plants, mostly herbaceous, with bulbous, tuberous, or creeping root-stocks. The leaves are generally sword-shaped and in two rows. The colored perianth is six-partite. The stamens are three, with anthers turned outwards. The ovary is inferior; there is one style, with three stigmas which are often petal-like. The fruit is a three-celled, three-valved capsule. About seven hundred species are known, of which the greater number are natives of warm countries.

IRELAND, JOHN, born in Kilkenny, Ireland, September 11, 1838; came to the United States when a child, and settled in Minnesota. On December 21, 1861, he was ordained at St. Paul. After serving as an army chaplain he became rector of the cathedral at St. Paul, and in 1875 was made coadjutor bishop. He was a prominent member of the Vatican Council of 1870, and has engaged in the work of establishing colonies of Catholics in Minnesota and the Northwest.

IRON, PRODUCTION OF IN UNITED STATES. For the general article on iron, see *Britannica*, Vol. XIII, pp. 278-359. The latest reliable statistics of the production of iron in the United States are those of the census of 1890, reported by Doctor William M. Sweet, of Philadelphia, from which we quote the following summaries:

The production of Pig-Iron during the year ended June 30, 1890, was the largest in the history of the iron industry of this country, amounting to 9,579,779 tons of 2,000 pounds, as compared with 3,781,021 tons produced during the census year 1880 and 2,052,821 tons during the census year 1870. From 1870 to 1880, the increase in production amounted to 1,728,200 tons, or nearly 85 per cent, while from 1880 to 1890, the increase was 2,798,758 tons, or over 153 per cent.

The pig-iron industry of New England has been practically stationary during the past twenty years, while during the same period, and especially since 1880, there has been a wonderful development of the manufacture of pig-iron in all other sections of the country.

The relative rank of the various States is seen to have undergone many changes since 1880. Pennsylvania still retains its leadership as the producer of about one-half of the pig-iron that is annually made in the United States, producing 51 per cent. of the total production in the census year 1880, and over 49 per cent. in 1890. Ohio was second in rank in both 1880 and 1890, the output of pig-iron in the former year being over 14 per cent. of the total production in the United States, and in the latter year over 13 per cent. Alabama, which occupied tenth place in 1880, with an output of 62,336 tons, is now the third largest producer of pig-iron, the production of this State in 1890 amounting to 890,432 tons, an increase of more than 1,323 per cent. over the production of 1880. Illinois which was seventh in rank in 1880, is fourth in 1890; and New York, which was third in 1880, occupies fifth place in 1890. Virginia, which was seventeenth in rank in 1880, is now sixth; while Tennessee has gone from thirteenth to seventh place.

Notwithstanding the fact that the production of pig-iron has increased from 3,781,021 tons of 2,000 pounds in 1880, to 9,579,779 tons in 1890, the total number of completed furnaces has decreased during the ten years from 681 to 562. Many furnaces which were in the active list in 1880, have since been abandoned, owing to their inability to profitably compete with the larger, better located, and more modern furnaces of the present day. The majority of these abandoned furnaces were of small

capacity, and were able to produce and market pig-iron only during periods of great demand and consequent high prices, while the large number of new and improved furnaces which have been built during recent years, and which are favorably located for the supply of materials at low cost and within easy access to market, have now made the operation of these antiquated furnaces unremunerative even in periods of the greatest activity.

Pennsylvania shows a decrease of 45 furnaces from 1880 to 1890, and during the same period the total number of furnaces in Ohio has decreased by 32. These figures, however, merely exhibit the net decrease in the number of furnaces, as many large bituminous coal and coke furnaces have been erected during this period in these as well as in other States to take the place of small stacks abandoned. Since 1880 there have been 232 furnaces abandoned in the United States, owing either to unfavorable location or to give place to larger and more modern plants, while during the same period 163 new furnaces have been built, in addition to a large number of plants that have been scientifically remodeled and enlarged by the addition of new and more efficient machinery.

At the close of the census year 1890, the total number of blast furnaces which were active or likely to be some day active was 562, of which 169 were anthracite or anthracite and coke furnaces, 253 coke and bituminous coal furnaces, and 140 charcoal furnaces. Of the total number of furnaces at the close of 1880, there were 229 anthracite or anthracite and coke furnaces, 195 coke and bituminous coal furnaces, and 257 charcoal furnaces. In the decade from 1880 to 1890, there is seen to have been a decrease of 60 in the number of anthracite or anthracite and coke furnaces, a decrease of 117 in the number of charcoal furnaces, and an increase of 58 in the number of coke and bituminous coal furnaces.

Of the 562 completed furnaces at the close of the census year 1890, there were 338 in blast, of which 110 were anthracite or anthracite and coke furnaces, 165 coke and bituminous coal furnaces, and 63 charcoal furnaces. The number of furnaces building at the date mentioned was 39, of which 9 were in Virginia, 7 in Alabama, 5 in Pennsylvania, 4 in Illinois, 3 each in Kentucky, Tennessee and Michigan, 2 in Maryland, and 1 each in Georgia, Ohio and Wisconsin.

One of the most noticeable features in the growth of the manufacture of pig-iron in this country during the past decade is the development of the blast-furnace industry of the southern States. In 1880, the South already commenced to appreciate the value of the extensive deposits of iron ore and coal within her borders and to realize the superior advantages which she possessed for the cheap production of pig-iron, owing to the close proximity to each other of these materials, and a number of large coke furnaces were built in that year and the few succeeding years. The greatest activity, however, in undertaking new furnace plants was in 1887, during which year 5 new furnaces were blown in and 25 others were under construction. There has been but little abatement in this activity to the present time.

The greatest activity in the development of the Southern pig-iron industry during the past decade is seen to have been in Alabama. This State produced in the census year 1890 one-half of all the pig-iron made in the South, and was only exceeded in production in the United States by Pennsylvania and Ohio. Virginia and Tennessee now occupy, respectively, second and third places among the

pig-iron producing States of the South. Prior to the census year 1890, Tennessee was the second leading manufacturer of pig-iron in that section, but the activity which has been noticeable during the past few years in Virginia in the erection of new furnaces has placed this State next to Alabama among Southern States in the quantity of pig-iron produced. In 1880 West Virginia was the leading producer of pig-iron in the South, but in 1890 it was fourth in rank.

The production of Bessemer pig-iron in the United States during the census year 1890, which is included in the figures of total production of pig-iron, amounted to 4,233,372 tons. Of this quantity Pennsylvania made 2,567,813 tons; Illinois, 616,659 tons; Ohio, 526,654 tons; New York, 174,574 tons; West Virginia, 101,178 tons; Maryland, 77,754 tons; Missouri, 68,629 tons; Wisconsin, 43,728 tons; New Jersey, 41,479 tons, and all other States a total of 14,904 tons. Of the total production of Bessemer pig-iron in Pennsylvania in the census year 1890, the Lehigh Valley produced 257,844 tons; the Schuylkill Valley, 148,026 tons; the Upper Susquehanna Valley, 132,886 tons; the Lower Susquehanna Valley, 493,288 tons; the Juniata Valley, 23,378 tons; the Shenango Valley, 298,792 tons; Allegheny county, 995,721 tons, and the remainder of the State, 217,848 tons. Of the total production of Bessemer pig-iron in Ohio in the census year 1890, the Mahoning Valley produced 96,605 tons; the Hocking Valley, 29,453 tons, and the remainder of the State, 400,596 tons.

The production of spiegel-eisen in the census year 1890, which is included in the figures of total production of pig-iron, amounted to 149,959 tons, as compared with 12,875 tons produced in the census year 1880. Four States made spiegel-eisen in 1890, viz., New Jersey, Pennsylvania, Illinois, and Colorado, while in 1880, only New Jersey and Pennsylvania were engaged in its manufacture.

The development of the iron industries in the Northwest has of late years been phenomenal. The opening up of the great Gogebic and Menominee iron ranges, and the exploitation of vast deposits of homalite in the iron districts of Minnesota have given an extraordinary impetus to iron manufactures and the production of iron and steel products, such as beams for building purposes. It has also led to the establishment of steel ship-yards on the Great Lakes.

IRON MOUNTAIN, or IRON MOUNT, a hill in St. Francois county, Mo., 81 miles southwest of St. Louis. It is about 800 feet higher than the adjacent plain and covers 500 acres. It yields from 50 to 60 per cent. of good iron, free from sulphur, magnetic, and softer than that of Pilot Knob. The amount of iron appears to be immense as it is 50 feet in thickness and of unknown depth. Iron Mountain village contains blast furnaces and factories. Pop. (1890), 1,101.

IRONTON, a city, the county-seat of Lawrence county, Ohio, situated on the Ohio River, 3 miles above Portsmouth, about 140 miles above Cincinnati, and 50 miles southwest of Pomeroy. The city is built on a small plain or bottom at the base of hills which abound in iron ore and bituminous coal. At Ironton there are several rolling-mills, iron foundries, furnaces and other manufactories. Iron is the chief article of export. Population in 1880 8,857; in 1890, 10,939.

IRVING, JOHN HENRY BRODRIBB, actor, was born in England, February 6, 1838, and made his first appearance on the boards of the Sunderland theater, September 29, 1856. On September 25, 1859, he appeared at the Princess theater, London, where he remained about three months. He proceeded in

April, 1860, to Glasgow, and remained there until the 29th of the following September. From January, 1866, to July in that year, he was engaged at the Prince of Wales' theater; Liverpool, and on July 30th was engaged to play with Miss Kate Terry, of Manchester, by Mr. Dion Boucault, in an original play of his, entitled *Hunted Down*. This led to a London engagement, when he came out at the St. James' theater as "Doricourt" in the *Belle's Stratagem*. In December, 1867, he proceeded to the Queen's theater, and subsequently acted in the provinces from time to time, as well as at various London houses. In May, 1870, he transferred his services to the Vaudeville theater, where he appeared as "Digby Grant" in Mr. Albery's comedy of the *Two Roses*, which character he sustained for 300 consecutive nights. His next appearance, Nov. 20, 1871, was at the Lyceum theater, in the *Bells*. He afterward represented the principal characters in Mr. Willis' dramas of *Charles I.* and *Eugene Aram*, 1873, and "Richelieu" in Lord Lytton's play. His representation of "Hamlet" at the Lyceum theater (October 31, 1874) produced a great sensation among the play-going public. *Hamlet* was played for 200 nights, the longest run of the play on record. In January, 1877, Mr. Irving added to his Shakespearean repertory by playing *Richard III.* at the Lyceum. The most remarkable incidents of Mr. Irving's management have been the production of *Othello* (in which he alternated the parts of the "Moor" and "Iago" with Mr. Edwin Booth), *The Merchant of Venice*, *Much Ado About Nothing*, *The Cup*, *Twelfth Night* and *Faust*, all of which have been played in conjunction with Miss Ellen Terry. A public banquet was given to Mr. Irving at St. James' Hall, on July 4, 1883, shortly before his departure with the Lyceum company, for a theatrical tour in the United States. A second visit to America was paid in 1884, and since then Mr. Irving has twice made tours through the United States.

IRVING, THEODORE (1809-1880), an American educator. In 1836 he became professor of history and belles-lettres in Geneva College, and in 1843 in the free academy of New York. He resigned in 1852, and in 1854 was ordained priest of the Protestant Episcopal Church. He held rectorships in Bay Ridge, L. I., Staten Island, and New York.

IRVINGTON, a village of Westchester county, N. Y., on the Hudson River Railroad, 24 miles from New York. Sunny Side, the former residence of Washington Irving, is in the immediate vicinity.

IRWIN, a post-borough of Westmoreland county, Penn., at the junction of the Pennsylvania and Youghiogheny railroads, 22 miles southeast of Pittsburgh. Several coal mines are here. Population (1890), 2,423.

ISABELLA II., MARIA ISABELLA LOUISA, ex-queen of Spain, was born at Madrid, October 30, 1830. Her father, Ferdinand VII., had been induced by the influence of his wife to issue the pragmatic decree, revoking the Salic law; and at his death, September 29, 1833, his eldest daughter, then a child, was proclaimed queen, under the regency of her mother, Maria Christina. This event proved the signal for civil warfare, as the claims of the late king's brother were warmly supported by certain classes of the people. The war of succession lasted seven years, and the country was desolated by the struggle between the contending Carlist and Christina parties, until the Cortes confirmed the claims of Isabella by pronouncing sentence of exile on Don Carlos and his adherents. In 1840 the queen-regnant, finding it impossible to carry on the government without making concessions to public feeling, for which she was indisposed, retired to France, resigning her power into the hands of

Espartero, whom she had been previously compelled to summon to the head of affairs. She was declared by a decree of the Cortes to have attained her majority, October 15, 1843, and took her place among the reigning sovereigns of Europe. Maria Christina returned to Madrid in 1845, and her restoration to influence was marked by the marriage of Isabella II. to her cousin, Don Francisco d'Assisi, the elder son of her maternal uncle, Don Francisco de Paula, which took place October 10, 1846. Sacrificed to the intrigues of a party whose interests were based on this uncongenial union, Isabella II. never knew the beneficial influence of domestic happiness, estrangements and reconciliations having succeeded each other alternately in her married life. On September 16, 1868, a great revolution broke out in Spain, starting with the fleet off Cadiz, which gradually spread over the whole peninsula. The speedy result was the formation of a republican provisional government under Prim, Serrano, and others at Madrid, and the flight of Queen Isabella to France. On November 6th her majesty took up her residence in Paris, where she remained during her exile, with the exception of an interval spent at Geneva during the Franco-Prussian war. On June 25, 1870, she renounced her claims to the Spanish throne in favor of her eldest son, the prince of the Asturias. After eight years of exile she returned to Spain.

ISHPEMING, a post-town in Ishpeming township, Marquette county, Michigan, 15 miles west-southwest of Marquette, and 3 miles west of Negaunee. It contains a foundry, a machine shop, a blast furnace, and a carriage factory, besides several important public institutions. It is supported mainly by the iron mines, which are very rich, and there are several iron furnaces in the vicinity. Population in 1880, 6,039; in 1890, 11,184.

ISLAND (A. S. *igland*, *ig* "island," and *land*), land surrounded by water. The larger masses of land surrounded by water, or parts of them, are continents, and the term island is usually restricted to the smaller. Two classes of islands may be distinguished—continental and oceanic. Continental islands are closely allied by the structure of their rocks to the nearest continental land from which they are rarely far distant, although sometimes, as in the case of Madagascar and New Zealand, they are separated by depths exceeding 1,000 fathoms, and generally lie to the south and east of the continent with which they are associated; the only exceptions to this rule being islands separated by depths less than a hundred fathoms. With the exception of Madagascar and New Zealand, whose separation is unusually complete, the plants and animals of continental islands are similar to those on the adjacent continent, and from the differences detected the period of separation has sometimes been calculated. Groups of continental islands inclosing seas stretch from the southeast peninsula of each of the northern continents toward the nearest southern continent. Oceanic islands rise abruptly from great depths, and show no geological continuity with the continents. They appear above the surface either as *volcanic islands*, usually rugged peaks or vast accumulations of lava, nearly as precipitous below the surface as above, or as *coral islands*. Numerous submarine mountains have been discovered in parts of the ocean, which only require moderate elevation, or the deposition of sediment or coral growth, to appear on the surface as islands.

ISLE LA MOTTE, an island in Lake Champlain, about 30 miles north of Burlington, constituting the township of Isle la Motte, Grand Isle county, Vt. It is six miles long.

ISLES OF SHOALS, a group of eight small islands, 10 miles S. E. of Portsmouth, N. H., inhabited chiefly by fishermen. On White Island is a revolving light, 87 feet above the level of the sea, and on Appledore and Star Islands there are hotels for the accommodation of summer visitors who resort to the islands to enjoy the sea-air.

ISLIP, a township and village of Suffolk county, Long Island, N. Y., situated on Great South Bay. It has flour, paper and planing-mills, a marine railroad, a shipyard and establishments for putting up canned goods. This is the headquarters of several sporting clubs, and here fishing and the rearing of trout are important industries. Population of township, 8,747.

ISMAIL PASHA, ex-Khedive of Egypt, born at Cairo in 1830. His father was Ibrahim Pasha. After Ismail's education at Paris had been finished he returned to Egypt in 1849, his father having died. Said Pasha, viceroy of Egypt in 1856, employed Ismail in various missions to European courts; and in 1862, when Said Pasha visited Europe, he left the administration in charge of Ismail, and when Said Pasha died, in 1863, Ismail succeeded as viceroy. By means of his wealth he obtained in 1866 from the Sultan of Turkey the privilege of succession in direct line for his dynasty, and soon afterwards he obtained other concessions, which freed him from Turkish supervision, and procured for him the title of "Khedive." He introduced many foreign customs; opened the first Egyptian parliament in 1866; and pushed his conquests in the valley of the White Nile with the aid of Sir Samuel W. Baker. In 1869 he performed the ceremonies connected with the opening of the Suez Canal. By contracting many loans in England and France he created a public debt of 400 million dollars, which forced him in 1875 to sell his shares in the Suez Canal to the British government. In 1876 he suspended payment of interest on the bonds he had issued, and was compelled to relinquish his estates to the creditors. As the army and the people became discontented, especially at his introduction of many foreign officials, and the heavy taxation, Ismail abdicated in 1878 in favor of his son Tewfik Pasha. He died April 25, 1865.

ISRAELS, JOSEF, a Dutch painter of much merit, was born at Gröningen in 1824. He studied in Amsterdam, under Kruseman, and next in Paris, under Picot; and received gold medals of honor in Paris, Brussels, and Rotterdam. He also had conferred upon him the Belgian Order of Leopold, and was nominated a member of the French Legion of Honor. His principal paintings are: *The Tranquil House*; *The Shipwrecked and The Cradle*; *Interior of the Orphan's Home at Katwyk*; *The True Support*; *The Mother*; and *The Children of the Sea* (in the Queen of Holland's collection). In 1873 he exhibited at the French Gallery in Pall Mall, *Minding the Flock*, which added considerably to his reputation. Mr. Israels has resided in the Hague for many years.

ISTRIA. The *nom de plume* of the Princess Helen Ghika, a daughter of Michael Ghika. She was born at Bucharest, in 1829, and was married to the Russian Prince Koltzoff-Massalsky in 1849. Disliking absolutism, she left Russia in 1855. Garibaldi, in 1861, when she was in Italy, sought her influence with the Roumanians, to induce them to rise against Austria. The Princess is a great linguist, an enthusiastic advocate of the rights of her sex, and the champion of oppressed nationalities. Since 1850 she has been a contributor to the *Revue des Deux Mondes*, and has written voluminously for French, Belgian, Greek, German, Italian, English, and American journals. She has given to the

world, in the course of a most industrious literary life, no less than fourteen works, history and fiction, the most of the latter being "novels with a purpose." She has written extensively on the essential and vital questions affecting the political and social future of the Greeks, the Albanians and the Slavs of Northern Europe.

ITALY. For general article on the Kingdom of Italy, see *Britannica*, Vol. XIII, pp. 434-516.

The latest and most reliable survey of the Kingdom places its area at 110,657 square miles, made up as follows: Continental and peninsular Italy, with the small islands embraced in its administration, 91,422 square miles. Sicily and the islands administratively dependent on it, 9,939 square miles. Sardinia and the islets near it, 9,296 square miles. These are the official figures for the Kingdom. The population (estimated) in 1890 was 30,947,306, but this is based solely on the difference between births and deaths and takes no account of emigration, and it must be remembered that within the eight years 1882-89, 791,404 persons left Italy for different parts of America, as many as 113,066 leaving the country in 1889 alone. This emigration to the new world was divided as follows: Brazil, 104,353; Argentine, 75,029; United States, 47,856. Summed up and in order to convey some idea of the area and population of modern Italy as unified, it may be stated that it is about the same size as Great Britain and Ireland and has about four-fifths as many inhabitants as that Kingdom. To its original territory, however, must now be added its African colonial possessions of Assab and Massowah, on the Red Sea; Keren and Asmara in Abyssinia; and the Dahlak archipelago, which embrace a total area of nearly 4,000 square miles, and were united into a colony bearing the name of Eritrea in 1889. Furthermore, in the exercise of a vigorous foreign policy, Italy has established a protectorate for some distance inland from Massowah, and along the coast from Ras Kasar (18° 2' N.) to beyond Assab. In 1889, the new Negus, King Menelek of Shoa, acknowledged the protectorate of Italy over Abyssinia.

On April 22, 1892, however, a somewhat more cautious and conservative colonial policy was inaugurated, when the Italian ministry decided to limit the national possessions in Africa to Massowah.

In 1890, in continental and peninsular Italy, the population included, in Piedmont, about 120,000 French and some 3,000 of Teutonic origin, and in southern Italy at least 60,000 of Albanian and 20,000 of Greek origin. In Sardinia there are from 7,000 to 8,000 of Spanish descent.

The urban population of Italy is upon the increase. Rome in particular shows a remarkable increment within the last decade. Numbers of magnificent modern residences have been erected, while the neighborhood of the city is dotted with splendid villas and suburban residences. The foreign population of Rome is continually receiving additions from the outside world. It has become, more than ever, the objective point of the student of the fine arts, to which almost every country of the eastern and western hemispheres contributes its annual quota.

REIGNING KING.—Umberto I, born March 14, 1844, is the eldest son of King Vittorio Emanuele II of Italy and of the Archduchess Adelaide of Austria. He succeeded to the throne on the death of his father, January 9, 1878. He was married on April 22, 1868, to Queen Margherita, the only daughter of the late Prince Ferdinand of Savoy, Duke of Genoa. The heir apparent, Vittorio Emanuele, was born Nov. 11, 1869. His title is the Prince of Naples.

GOVERNMENT.—The government of the country is a constitutional monarchy, the executive power being vested in the king, with succession in the male line, this power being exercised through a responsible ministry. The legislative functions are in the hands of the king and parliament conjointly, the latter consisting of a senate and chamber of deputies. The senate is composed of the princes of the royal house who are of age, and of an unlimited number of members, above forty years old, who are nominated by the king for life. Those who have distinguished themselves in science, literature or any other pursuit tending to the benefit of the nation or who pay taxes to the amount of 3,000 lire annually, constitute the classes from which these senators are chosen. The deputies of the lower house are chosen according to the electoral law of September 24, 1882 (modified as regards future parliaments by the law of May 5, 1891, abolishing the *scrutin de liste*), by ballot, by all citizens who are twenty-one years of age, can read and write, and pay taxes to the amount of 19 lire. Members of academies, professors, persons who have served their country under arms for two years, and numerous other classes, are qualified to vote by reason of their position. In the beginning of 1890, there were 335 senators. In 1890, the number of enrolled electors was 2,826,055, including 78,397 temporarily disfranchised on account of military service. At the general election in November, 1890, the number of those who voted was 1,477,173, or 53.6 per cent. of those who had the right to vote. Neither senators nor deputies are paid, but they have the right to travel free by rail or steamer in any part of Italy. Money bills must originate in the lower house. The parliaments are quinquennial, but may be dissolved by the sovereign at any time. The ministers, eleven in number, are not necessarily members of either house. Should the king dissolve parliament, he is bound to order new elections and convoke a new meeting of that body within four months. It is incumbent upon the executive to call the parliament together annually. The ministers have the right to attend the debates of both the upper and the lower house; but they have no votes unless they are members.

The executive power is exercised, under the king, by a ministry, divided into the following eleven departments: the presidency of the council and the ministry of foreign affairs; the ministry of the interior; the ministry of finance; the ministry of the treasury; the ministry of justice and of ecclesiastical affairs; the ministry of war; the ministry of marine; the ministry of commerce, industry and agriculture; the ministry of public instruction; the ministry of public works; the ministry of posts and telegraphs. The government of the provinces, with a prefect at the head of each, is very much the same as in France.

THE ARMY.—Universal liability to arms forms the basis of military organization in Italy. A certain portion of all the young men who have completed their twentieth year, amounting to about 200,000, is levied annually, 82,000 of whom are drafted into the standing army, while the rest are entered in a second and third category. By recent legislation (June 28, 1891), the term of compulsory service was slightly lengthened for some classes. To secure the strength required for the army special provision has been made for an increase of the annual normal contingent of the first category from 32,000 to 95,000 men, and there has been some modification in the law of recruiting, reducing the number of people exempt from military service. According to the law of August 6, 1883, the time of service in the standing army for the first category of recruits is five

years in the infantry, four years in the cavalry and three years in the other branches. Having completed their service under arms, the men of the first category are granted unlimited leave, but are enrolled in the permanent army, the infantry for four years, the cavalry five years, when they are both transferred to the territorial militia. The men belonging to the other arms of the service are enrolled in the permanent army for five or six years, when they are transferred to the mobile militia, in which they complete twelve years of service before being transferred to the territorial militia. Those of the second category are entered in the permanent army for eight years and the mobile militia for four years, when they form part of the territorial militia. The men of the third category are entered at once in the territorial militia, but are given unlimited leave. The total period of service is 19 years. As in the German army, young men of superior education are permitted under certain conditions to serve as one year volunteers.

The strength of the Italian army in February, 1891, was as follows:

Permanent Army.—Officers under arms, 14,508. Officers on unlimited leave, 11,686. Troops under arms, 261,505. Troops on unlimited leave, 554,446. Total under arms, 276,013. Total on unlimited leave, 566,152.

Militia.—Mobile officers, 4,012; mobile troops, 445,004. Total mobile, 449,016. Territorial officers, 5,250; territorial troops, 1,547,908. Total territorial, 1,553,158. Grand total for the army, 2,844,339.

There is a staff-college and a school for engineer officers at Turin, others for infantry and cavalry officers at Modena and Parma, for cavalry officers at Pinerolo, and for the sanitary corps at Florence, and military colleges at Milan, Florence, Rome, Naples and Messina. A chain of fortresses has been erected along the northern frontier. There are numerous forts and batteries in the basin of the Po and along the coast. Rome is protected by a circle of fifteen forts.

Under the terms of the tripartite agreement, called the triple alliance, between Austria, Germany and Italy, the Italian government is bound, equally with its allies, to contribute to the defense of allied territory in case of its invasion by hostile troops, receiving, in its turn, the coöperation of the Austrian and German arms.

THE NAVY. *Ships.*—After the disastrous defeat at Lissa in 1866, the Italian navy, the defects of which had been thus made conspicuously apparent, was reconstructed; and now, after years of unremitting exertion, Italy is one of the strongest maritime powers of Europe. In 1876, ten years only having elapsed since the commencement of the reconstruction period, the navy included 14 armored, seven unarmored and two dispatch vessels, besides other vessels that brought the effective total to 53, with an armament of 298 guns. The thickest armor was then 8½ inches. In 1890, Italy had 18 armored battle-ships, 19 protected cruisers, nine dispatch-vessels, six torpedo cruisers, one seagoing torpedo boat and eight gun vessels; the maximum thickness of armor carried by these vessels was 21½ inches, and their approximate value was put at 8½ millions sterling. There were also 128 torpedo boats and other vessels that brought the total to 234 ships, representing with their armament a value of \$75,000,000. Two of the armor-clads, the *Italia* and *Lepanto*, launched in 1880 and in 1882 respectively, are of 13,898 and 13,550 metric tons displacement. They are 400 feet long, 74 feet beam, and have a mean draught of water exceeding 30 feet. There is no vertical belt armor protecting the water-line, but instead of it a deck covered with 4 and 3-inch

steel plates is built about six feet below water. The cost of each of these formidable battle ships was over a million sterling. The *Duilo* and *Dandolo*, of 11,138 and 11,202 metric tons displacement respectively, belong to the central citadel type.

Men.—The navy was manned in 1891 by seven vice-admirals, 17 rear-admirals, 175 captains, 330 lieutenants and sub-lieutenants, 44 marine guards, besides 266 engineers and machinists, 161 medical staff, 308 commissariat, 119 "del corpo Reale Equipaggi," and 19,604 men, there being 689 officers and 48,603 men on unlimited leave or in reserve. The total of all ranks for the navy was thus 70,323.

MERCANTILE MARINE.—On Jan. 1, 1891, there were 6,442 sailing vessels of 684,209 tons and 290 steamers of 186,567 tons; in all 6,732 vessels of 820,776 tons. In 1890 there entered Italian ports 111,586 Italian vessels of 14,610,961 tons, and 10,146 foreign vessels of 7,848,512 tons; in all 121,732 vessels of 22,459,473 tons. There cleared from Italian ports 110,790 Italian vessels of 22,459,473 tons, and 9,930 foreign vessels of 7,776,555 tons; in all 120,720 vessels of 22,301,704 tons.

The sea-fisheries are an important factor in the support of the population of Italy's extended seaboard, which is 2,272 miles on the peninsula in addition to that of the islands, which is 1,944 miles. These fisheries around the coast and the lagoons are very valuable. On Jan. 1, 1890, the number of vessels and boats employed in fishing was 19,378, with an aggregate tonnage of 52,797. These numbers include 64 boats of 262 tons engaged in coral fishing. At the same date there were 57,355 fishermen, of whom 6,602 were engaged in deep-sea or foreign fishing. In 1890 there went to the deep-sea fishing 1,706 boats of 15,261 tons. Of these, 36 of 102 tons were employed in coral-fishing, and 98 of 1,403 tons in fishing for sponges. The value of the fish caught in 1889 (excluding foreign fishing) was estimated at 13,953,505 lire, probably too low an estimate; the value obtained from tunny-fishing was 1,946,700 lire and from coral-fishing 164,732 lire, the quantity (much less than the average) being estimated at 3,485 kilogrammes.

INTERNAL COMMUNICATIONS. Railways.—A large portion of the Italian railways belong to the state, but in accordance with a law of April 27, 1885, the working of the state lines has been transferred to private enterprise. The contracts are for 60 years, but at the end of 20 and 40 years they may be terminated.

On Jan. 1, 1889, there were 8,167 kilometres of state railway, 149 kilometres jointly state and companies', and 4,272 kilometres of companies' railway; in all, 12,588 kilometres. The length of the principal lines, Jan. 1, 1891, was:—Mediterranean, 4,800 kilometres; Adriatic, 5,212 kilometres; Sicilian, 729 kilometres; Sardinian, 759 kilometres; various, 1,663 kilometres; total, 13,163 kilometres.

In 1888 the total receipts were 249,993,973 lire, of which 100,580,634 lire were for passenger traffic. In the same year the expenses were 165,364,975 lire. By slow trains there were forwarded 15,630,967 tons of goods, and by fast trains 8,352,480 quintals of goods. The number of passengers was in all 49,333,266.

Up to January 1, 1891, there had been constructed 2,539 kilometres of tramway in the principal cities.

POSTS AND TELEGRAPHS.—During the year ending June 30, 1890, there were transmitted 171,631,040 letters and post-cards, to which 39,075,241 government official letters have to be added. There were sent also 6,730,064 manuscript papers, 170,149,368 periodicals and other printed matter, and 5,817,208 parcels. The money orders numbered 5,648,313, value 608,412,273 lire. The total receipts were 45,-

420,386 lire, and expenses 39,245,300 lire. In 1891 there were 5,511 post-offices.

The public telegraph service is a monopoly of the government, certain concessions, however, being made to the railway and tramway companies. In 1891, the length of line and wire on land was 170,574 kilometres.

During the year ending June 30, 1890, there were despatched from government and railway telegraph offices 7,342,188 private telegrams inland, and there were sent or received from abroad 1,501,053 telegrams. The receipts amounted to 15,242,221 lire, and the expenses to 14,250,048 lire. Number of state offices, 2,602; other offices, 1,851.

There are 17 miles of railway from Massowah to Saate. In 1889-90, the post-office at Massowah forwarded 241,807 letters and post-cards, 1,352 manuscripts, 3,640 newspapers and 12,011 parcels. There is a telegraph line of 515 kilometres from Massowah to Assab, and one of 101 kilometres from Assab to Perim. In 1889-90, 9,361 messages were sent.

WATERWAYS, NAVIGABLE RIVERS, etc.—The total length of navigable canals, mostly in Lombardy and Venice, is 655 miles. The rivers are navigable for about 750 miles.

COMMERCE AND MANUFACTURES.—In 1890, Italy ranked eighth among the great continental nations in commercial supremacy. Her foreign trade is facilitated by her extensive seaboard, and has lately received an extraordinary impulse through railroad connections with countries beyond the Alps, by means of those gigantic engineering works, the St. Gothard and Mont Cenis tunnels, thus connecting Italy with central and western Europe. The imports of the kingdom, for 1890 (excluding gold, coined silver and goods in transit), were 1,319,638,433 lire, and the exports 895,945,253 lire. The imports of the precious metals for the same period were 57,648,000 lire and the exports 66,655,100 lire.

Partly because of the high cost of fuel, Italy does not rank among the great manufacturing countries of Europe, but in some branches of trade her productions are of considerable importance. The manufacture of thread and cotton tissues shows a steady advance, as does also the spinning and weaving of wool. Machinery, manufactured principally at Turin and Milan, was valued at over £4,000,000 in 1892. Manufactures of glass and ceramics, £2,500,000. About six million tons of corn and maize are ground annually. The manufacture of tobacco is a government monopoly. The present (1893) annual production exceeds 40,000,000 pounds. The output of the tanneries is estimated at £4,000,000, and there is a considerable export of gloves. There are numerous paper-mills in Piedmont, Lombardy and Campania, and factories of straw hats, the principal being at Florence, and of cloth, silk and felt hats in Piedmont especially.

AGRICULTURE.—The vast majority of the population of Italy find employment in agricultural pursuits. Of the entire area of the kingdom 87 per cent. is returned as productive, the unproductive tracts embracing only the higher mountain districts and the marshes, and even these latter are being gradually drained. The production of cereals falls below the needs of the population. Hence large importations of wheat and maize are made annually.

In 1890 Italy had 5,000,000 cattle, 6,900,000 sheep, 1,800,000 goats, 1,800,000 swine. In 1889 Italy exported 21,946 and imported 52,391 cattle; exported 33,784 and imported 5,762 sheep; exported 4,678 and imported 2,289 goats; exported 127,028 and imported 3,334 swine. The wool product is not, however, sufficient for consumption, the export in 1890 being only 13,305 quintals and the import 82,230 quintals.

The total weight of the cocoon harvest in 1881 was 91,683,000 pounds; in 1882, 70,000,000 pounds; in 1883, 92,886,200 pounds; in 1884, 80,000,000 pounds; in 1885, 70,985,000 pounds; in 1886, 91,000,000 pounds; in 1887, 94,656,700 pounds; in 1888, 96,786,173 pounds; in 1889, 75,678,000 pounds; in 1890, 89,866,800 pounds.

In the census of December 31, 1881, there were 5,024,826 males of 15 years of age and upwards described as engaged in agriculture. The entire agricultural population, male and female, of 15 years and upwards, was thus about 10,000,000. According to last census the number of persons of 15 years of age and upwards was to the whole population in the ratio of 678 to 1,000; thus the whole agricultural population was computed to be 14,900,000.

MINERALS.—There is a singular lack of deposits of bituminous coal in Italy, nor is there iron to be found, save in a very few localities. A small quantity of anthracite coal and about 300,000 tons of lignite are mined every year, most of the latter being found in Tuscany and Umbria. Peat is largely used for fuel and is found in many districts. Nearly all the iron is mined in Elba and some in Lombardy and Piedmont. The great mineral product of Italy is sulphur, which represents nearly half of the annual value of all minerals raised throughout the kingdom; of this nearly nine-tenths is obtained in Sicily. The number of persons employed in this industry was over 50,000 in 1891. The total value of the mineral products decreased in 1882-88 from £2,952,610 to £2,095,116. In 1888 the principal items were sulphur, £1,000,500; zinc ores, £286,500; lead ores, £276,500; lignite, etc., £107,000; iron ores, £80,000; silver ores, £77,000; mercury £68,000; copper ores, £65,000; boracic acid, £52,000; and gold ores, £19,500. In addition to these industries must be mentioned the quarrying of marble, granite and alabaster, valued at nearly a million sterling annually, and employing some 20,000 men. The marble of Carrara is especially famous, as is also the alabaster of Volterra, near Pisa.

FINANCES.—The finances of Italy present an interesting study. In addition to the cost of the war with Austria and the debts of the old Italian States, the young kingdom has had to face for many years the extraordinary expenses connected with the placing of its army upon a suitable war footing and the reconstruction of its navy. In addition to this it has had to meet the expenses entailed upon it by its signature of the tripartite agreement, which compels the government to keep itself in a position to repel at any time an invasion of the territory of its allies. In 1862 there was a deficit of nearly £18,000,000, and it was not until 1875 that the first small surplus was obtained. Except the first half of 1884, the next ten years showed a surplus, larger or smaller; but each of the four years following 1885 ended in a deficit. Both income and expenditure have steadily increased: in 1862 the former was over £19,200,000, the latter £37,000,000; in the financial year 1888-89 the actual revenue was £60,034,000, the expenditure £69,409,000—deficit, £9,375,000. The chief sources of income are the customs, the income, land, and house taxes, and the tobacco monopoly; the principal expenses are the interest of the public debt, exceeding 21 millions sterling, and the cost of the army and navy, which is nearly as great. In proportion to the productivity of the country, Italy's public debt is very heavy. At the end of 1861 it was slightly over £125,000,000; but a long succession of annual deficits, extensive railway and other public works, and costly armaments have raised it year by year.

The capital of the consolidated and redeemable

debt amounted to 11,800,454,529 lire on July 1, 1891, or about £474,018,180 sterling.

The burden of the debt per head of population is £15, and of the interest 14s. The value per head of the special exports in 1890 was £1 8s. 9d.

There is no national bank in Italy. There are six banks authorized to issue notes.

There are 692 co-operative credit societies and popular banks, with assets at the end of 1888 amounting to 742,747,344 lire, and liabilities 732,919,581 lire; 161 ordinary credit companies, with assets 2,152,864,193 lire, and liabilities 2,130,317,730 lire. Eleven agrarian credit companies had assets 58,579,154 lire, and liabilities 58,317,156 lire. There are 9 *crédit foncier* companies, with assets 778,999,121 lire, and liabilities 773,001,998 lire.

The post-office savings-banks have been in operation since January 1, 1876. Private savings-banks are subject to certain statutory rules and to government inspection. On January 1, 1890, the books of these various institutions showed deposits and repayments respectively as follows: Post-office savings banks, 181,328,710, 168,558,980. Ordinary savings banks, 402,307,595; 375,467,719. Co-operative savings banks, 365,849,852; 372,269,299 lire.

There are several taxes imposed by the government which in the opinion of leading financiers should be done away with. Some of the state monopolies are also viewed with disfavor by the people. However, the more objectionable imposts have been removed, such as the grist tax. In 1883, the forced paper currency was withdrawn from circulation.

While by many competent judges it is believed that the finances of the young nation are hopelessly involved and that the enormous burdens imposed upon the people effectually preclude recovery; still some confidence is expressed that with the further industrial development of the southern provinces the condition may be greatly ameliorated.

Social Conditions.—The sanitary condition of nearly three-fourths of the entire population of Italy continues most deplorable. There is lack of drinking water in the houses and an almost total absence of sewers in the cities. In such cases the prevalence of disease is not to be wondered at. Matters, however, are improving gradually and deaths from the *pellagra*, a wretched complaint superinduced by insufficient diet, are less frequent than in former years. The condition of women and young girls is not what could be desired. Of 11,290,000 females in Italy over the age of nine years, nearly two millions are employed in industrial labor and over three millions are engaged in agricultural pursuits. The figures regarding juvenile labor—below the age of fifteen—are still more striking, as showing at how much lower an age Italian girls go to work than the juvenile male population.

Education.—Education is under a minister of public instruction. Nearly 1½ million sterling is set aside by the state annually for education, and to this the communes and provinces add 2½ millions. At the formation of the kingdom the general ignorance was incredibly profound, but notable progress has been made of late in the education of the masses of the people. Although possessed of many universities and learned societies of almost world-wide celebrity, since the stormy times of her struggle for national life, Italy has produced few men who have achieved eminence in literature. The name of the poet Carducci is the only one of great distinction.

In all cases the proportion of women illiterate is greater than that of men. The notion of intellectual equality between the sexes is confined to a few earnest reformers, and there is much less adequate

provision for the higher education of girls, although the universities nominally are open to women as well as men. The convent schools teach mainly embroidery and devotions, and the government and superior schools are not satisfactory. In 1861, however, a good high school for girls was opened at Milan, and its success has led to the establishment of many similar schools in other towns. Primary education is compulsory, and separate boys' and girls' schools are to be found in all but the very poorest communes. In 1861-86 the number of pupils (male and female) in these elementary schools increased from 885,152 to 2,252,898; in 1886 there were 46,073 such schools open, besides 7,555 private elementary schools. There were also 2,139 asylums for children, many of them conducted on the kindergarten system, with 252,763 children; and there were 7,144 night-schools with 283,230, and 5,886 Sunday-schools with 169,609 pupils enrolled, besides 133 normal schools with 10,542 pupils. In 1888 the gymnasiums numbered 728 (255 episcopal and 141 private), with 49,980 scholars; the lyceums, 321 (124 episcopal and 55 private), with 13,688 pupils. Also there were 481 technical schools and institutes (84 private), with 34,602 students; 23 mercantile marine schools (19 governmental), with 756 pupils; and 22 collegiate institutions and superior special schools, with 2,662 students and 170 "hearers." Finally, there are in Italy 21 universities, 17 of them governmental and four "free"—i. e., maintained by the provinces and communes; the total number of students and "hearers" was 15,911 in 1887-88, besides 70 who were entered at three lyceums that provide a university course.

ITASCA LAKE, a lake in Beltrami and Cass counties, Minn., the supposed source of the Mississippi River. Its elevation is 1,575 feet, and it receives various streams, one of which is several miles in length; this gives color to the theory that Itasca is not the source of the great river which here leaves the lake as a stream 12 feet wide and two feet deep.

ITATA, the name of a Chilean Congressional transport, which was seized in San Diego harbor by the United States authorities in April, 1891, while loading with arms and supplies for the insurgents during the revolution then in progress. The commander of the *Itata* steamed out of harbor when ready for sea, carrying with him a deputy United States marshal. As the permitting of this vessel to load from United States territory was held by the authorities at Washington to be a violation of the well established principle of international law which forbids the furnishing of contraband of war, and the opinion prevailed that a breach of neutrality had been committed in allowing the *Itata* to ship her cargo, an attempt was made to overtake the transport, and the cruiser *Charleston* was dispatched in pursuit of the Chilean vessel. The *Esmeralda*, a Congressional man-of-war, was waiting in Mexican waters to tranship the cargo of the transport. She had somehow learned of the pursuit of the *Charleston*, and it looked at one time as if a naval battle between the two vessels was unavoidable. The greatest excitement prevailed in the United States until it was learned that hostilities had been avoided by the surrender of the transport to Rear-admiral Brown, on June 4, according to a promise previously made to him by the Junta's minister of foreign affairs, that body preferring to lose their arms and ammunition to bringing about complications with this country. The ill feeling growing out of the *Itata* affair led, in a measure, to the massacre of the seamen of the United States war vessel *Baltimore*, in the city of Valparaiso, on Oct. 16, 1891, and the international complications which followed.

ITHACA, a village and county-seat of Gratiot county, Mich. It contains a furniture factory, a foundry, a newspaper office and several hotels and churches. Pop. (1890), 1,627.

ITHACA, the county-seat of Tompkins county, N. Y., situated at the south end of Cayuga Lake, 37 miles south of Auburn, 40 miles E. S. E. of Geneva, and 35 miles N. N. E. of Elmira. Ithaca is built partly on an alluvial plain, and partly on the slopes of high hills which inclose that plain on all sides except the north, and are nearly 600 feet higher than the lake. The town contains many public buildings, and also manufactories of flour, paper, carriages, farming implements, iron castings, machinery, etc. It is the seat of Cornell University. Population in 1880, 9,105; 1890, 11,557.

IUKA, a post-village, capital of Tishomingo county, Miss., situated on the railroad, 115 miles from Memphis, Tenn. It has a female institute, a male academy, and valuable mineral springs. Here occurred an indecisive battle between Gens. Rosecrans and Price on Sept. 19, 1863. Pop. (1890), 1,019.

IVES, LEVI SILLIMAN (1797-1867), an American Protestant Episcopal clergyman. In 1822 he was made deacon and in the following year was ordained priest. He held pastorates in Batavia, N. Y., Philadelphia and Lancaster, Pa., and in 1831 was elected bishop of North Carolina. In 1852 he became a Roman Catholic, and was made professor of rhetoric in St. Joseph's Theological Seminary, Fordham, N. Y.

IVISA, IVIZA or IVICA, the most southerly of the Balearic Isles. See *Britannica*, Vol. III, p. 278.

IVORY BLACK, a black pigment prepared from calcined ivory or bones. See *Britannica*, Vol. XIX, p. 88.

IVY. See *Britannica*, Vol. XIII, pp. 526-527.

IXCAQUIXTLA, the chief town of the Chucon Indians situated in the southern part of the state of Pueblo, Mexico. It is noted in Mexican history as the scene of a battle fought Jan. 1, 1817, between Mexican insurgents under General Mier of Teran and Spanish troops under La Madrid. There are extensive remains of antiquity in the vicinity.

IXTAPALAPA, a town of Mexico, 10 miles southeast of the capital. It was a large and important city at the time of the conquest of Mexico, and was celebrated for its splendid gardens belonging to the Aztec emperors. Few traces of its former importance now remain. Near the town is the Cerro de la Estrella, or Star Hill, where the Aztec priests performed peculiar religious rites. Remains of the ancient altar and temple still exist on the summit of the hill.

IZARD, GEORGE (1777-1828), an American soldier. In 1794 he was appointed a lieutenant of artillery; in 1798, engineer of fortifications in Charleston harbor; in 1799, captain; in 1812 colonel of artillery; in 1813 brigadier-general; and in 1814 major-general. From 1825 until his death he was governor of the territory of Arkansas. He published, in 1816, *Official Correspondence with the War Department in 1812 and 1815*.

IZARD, RALPH (1742-1804), an American statesman. In 1776 Congress appointed him a commissioner at the court of the grand-duke of Tuscany, and in 1780 he returned to the United States. In 1782-83 he was a delegate to the Continental Congress, and from 1789 to 1795 was a United States Senator from South Carolina. His *Correspondence from 1774 to 1784* was published in 1844.

IZUCAR, a town of Mexico, state of Pueblo, at the foot of the volcano Popocatepetl, in a fine sugar district. It is sometimes called Matamoros Izucar, in honor of the Mexican patriot of that name. Population, about 12,000.

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JACKSON—JACKSON

JACKSON, the county-seat of Amador county, Cal., 55 miles southeast of Sacramento, situated at the confluence of the north, middle and south forks of Jackson Creek. It has quartz mills and the chief occupations are gardening, farming, quartz and placer mining.

JACKSON, a city and county-seat of Jackson county, Mich., situated on Grand River, 76 miles west of Detroit, 37 miles south of Lansing, and 94 S. E. of Grand Rapids. It contains the State prison, several churches, schools, and banks, gas-works, water-works, flouring-mills, machine-shops, foundries, sash and blind factories, planing-mills, breweries, manufactories of furniture, agricultural implements, carriages and wagons, railroad-cars, pumps, and cigars, and also has several coal mines. Population in 1860, 4,799; in 1870, 11,447; in 1880, 16,105; in 1890, 20,779.

JACKSON, the capital of the State of Mississippi, and the county-seat of Hinds county, situated on the west bank of the Pearl River, 183 miles north of New Orleans, 45 miles east of Vicksburg, and 96 miles west of Meridian. Lat. $32^{\circ} 18' N.$, long. $90^{\circ} 6' W.$ It contains the State-house, the penitentiary, and several charitable and educational institutions. Many thousand bales of cotton are annually shipped from this place. Population in 1880, 5,204; in 1890, 6,041.

JACKSON, a city and county-seat of Madison county, Tenn., on the south fork of the forked Deer River, 90 miles E.N.E. of Memphis, and 107 miles south by east of Cairo, Ill. It is the seat of the Southwestern Baptist University, and has a court-house, a bank, an opera-house, several white and colored female seminaries, gas-works, planing-mills, an iron foundry, and railroad workshops. Cotton is the chief article of export. Population in 1870, 4,119; in 1880, 5,377; in 1890, 10,022.

JACKSON, CHARLES (1775-1855), an American jurist. In 1796 he was admitted to the practice of law in Newburyport, Mass., and in 1803 removed to Boston, where he attained a high rank at the bar. From 1813-24 he was judge of the Massachusetts Supreme Court, and in 1833 was chairman of a commission to codify the State laws. In 1828 he published a treatise on *Pleadings and Practice in Real Actions*.

JACKSON, CHARLES THOMAS (1805-1880), an American scientist. After studying medicine in America and Europe, he settled in Boston, Mass., and began the practice of his profession. In 1833 he opened a laboratory for research in analytical chemistry, the first of its kind in the United States. In 1836 he was made State geologist of Maine, in 1839 of Rhode Island, and in 1841 of New Hampshire, retaining the last office until 1844. In 1847 Congress appointed him to survey the mineral lands of Michigan, but, after two years devoted to this work, he was displaced in consequence of political changes. Dr. Jackson made many important scientific discoveries, one of the most valuable being that of etherization, for which he received a prize of 2,500 francs from the French Academy of Science. He published many papers and reports, besides a *Manual of Etherization, with a History of its Discovery* (1861).

JACKSON, CLAIBORNE FOX, born in Kentucky,

April 4, 1807; died at Little Rock, Ark., December 6, 1862. He was a member of the Missouri Legislature for many years, and in 1860 was governor of Missouri. His sympathies were with the South, and he attempted to carry his State with him, but failed, and was driven from office. He took service with the Confederate army, but failed to distinguish himself, and died early in the war.

JACKSON, CONRAD F., born in Pennsylvania, September 11, 1813; entered the army in 1861 as colonel of a Philadelphia regiment, and was killed at Fredericksburg, December 13, 1862, while leading his brigade into action.

JACKSON, HELEN MARIA FISKE, an American authoress, born at Amherst, Mass., Oct. 18, 1831, died at San Francisco, Cal., Aug. 12, 1885. She was educated at the Ipswich, Mass., female seminary, and in 1852 became the wife of Major E. B. Hunt (1822-63), of the United States Engineers. In 1875 she contracted a second marriage, to William S. Jackson, of Colorado Springs, Colo., where much of her after-life was spent. In 1879 she became interested in the treatment of the Indians by the United States Government, and in 1883 was appointed special commissioner to examine into the condition of the Mission Indians of California. Her literary productions, over signature "H. H.," began to attract attention about 1870, and soon won considerable popularity.

JACKSON, HOWELL EDMUNDS, an American jurist, was born at Paris, Tenn., April 8, 1832. He graduated from the West Tennessee College at Jackson, 1849. In 1850 he entered the University of Virginia and completed the course there. He began the practice of law at Jackson and in 1858 removed to Memphis. When the civil war broke out, he was appointed receiver under the Confederate sequestration act for West Tennessee. At the conclusion of hostilities he returned to Memphis and resumed the practice of his profession. In 1880 Mr. Jackson was elected to the Tennessee Legislature. He was elected United States Senator by that body in 1881. On April 12, 1886, Judge Jackson was nominated by President Cleveland as circuit judge of the United States for the Sixth Judicial Circuit. In February, 1892, he was appointed associate justice of the United States Supreme Court by President Harrison and the appointment was confirmed by the Senate.

JACKSON, ISAAC W. (1805-1877), an American educator. From 1826 to his death he was a professor at Union College. He did much toward developing the art of landscape-gardening and horticulture, and contributed largely to the introduction, perfecting, and distribution of the choicest flowers.

JACKSON, JAMES (1757-1806), an American soldier. He studied law in Savannah, Ga., and in 1776 was active in repelling the British from that city. He afterwards took part in many important battles, and attained the rank of brigadier-general. In 1788 he was chosen Governor of Georgia, but declined to serve, and from 1789 to 1791, was a member of the first Congress. From 1793 to 1795, he was United States Senator from Georgia, from 1798 to 1801, Governor of the State, and from 1801 to his death was again Senator.

JACKSON, JOHN ADAMS (1825-1879), an American

sculptor. After studying in Boston, Paris, and New York, he settled in Florence, where he produced numerous popular works.

JACKSONVILLE, a city and county-seat of Morgan county, Ill., situated 34 miles west by south of Springfield, 80 miles east-southeast of Quincy, 67 miles north of Alton, and 90 miles north of St. Louis, Mo. Jacksonville contains many handsome buildings, and is noted for its educational and charitable institutions. It is the seat of Illinois College, a high-school, a ladies' atheneum, the Illinois Female College, the Jacksonville Female College, a State asylum for the insane, an asylum for the idiotic, an institute for the education of the blind, and an institute for the deaf and dumb. The institutions for the blind and deaf and dumb are supported by the State. The city has a large woolen mill, car-works, water-works, a foundry, and manufactories of candy, paper, furnishing goods, boilers, etc. Population in 1860, 5,528; in 1870, 9,203; in 1880, 10,927; in 1890, 12,357.

JACKSONVILLE, the most populous city of Florida, and the county-seat of Duval county, situated on the left or west bank of the St. Johns' River, about 20 miles from its mouth. It is 30 miles southwest of Fernandina, 155 miles south by west of Savannah, and 165 miles east of Tallahassee. Latitude 30° 19' 38" north, by longitude 81° 30' west. Jacksonville has several churches and banks, a high-school, the Stanton Institute, and manufactories of lumber, marmalade, moss, soap, and machinery. Lumber is the chief article of export. Population in 1860, 2,118; in 1870, 6,912; in 1880, 7,650; in 1890, 17,160.

JACMEL, or **JACQUEMEL**, a port and city on the south coast of Hayti, 30 miles southwest of Port Au Prince. It has a deep, commodious harbor and carries on commerce with the United States.

JACOB, **BIBLIOPHILE**. See **LACROIX**, Paul, in these Revisions and Additions.

JACOBÆAN LILY (*Spreckelia Formosissima*), a plant of the order *Amaryllidæ*. The leaves are directly from the bulb, which is long-necked, protruding above the surface of the ground; the flowers are large, irregular, and of a brilliant crimson color. It is native in Mexico, and cultivated elsewhere.

JACOBI, **ABRAHAM**, an American physician, born in 1830. After studying medicine for several years in Germany, he settled in New York City. In 1861 he was made professor of diseases of children in the New York Medical College; from 1867 to 1870, held a similar chair in the medical department of the university of the city of New York, and in the latter year in the college of physicians and surgeons. He has held important offices in various scientific societies, and is the author of many valuable works on medical topics.

JACOBI, **MARY PUTNAM**, an American physician, wife of the preceding, born in 1842. She studied medicine in Philadelphia, New York, and Paris. For twelve years she was dispensary physician in Mount Sinai hospital, was professor of materia medica in the woman's medical college of the New York infirmary, and later became professor in the New York post-graduate medical school. She has contributed much to medical literature.

JACQUERIE, the name given to an insurrection of peasants in France in 1358, when the French king, John, was a prisoner in England. The nobles called the peasants contemptuously "Jacques Bonhomme;" hence the word *Jacquerie*. The rising was caused by long-continued oppression on the part of the nobles. It broke out in the neighborhood of Paris, but extended to the banks of the Marne and Oise. The magnitude of the danger

forced the nobles to make common cause, and on June 9th the peasants were defeated with great slaughter near Méaux. This put an end to the insurrection.

JAGERNDORF, or **KARNOW**, a walled town of Austrian Silesia, 34 miles west of Ratibor. It has manufactories of woolen cloth, linen, organs, etc. Population, 11,792.

JAGO, **JAMES, A.B., M.D., F.R.S.**, a distinguished English physician, anatomist and writer on medical and surgical subjects, was born on Dec. 18, 1815, near Falmouth, Cornwall. He was educated at Cambridge University and studied also at London, Dublin and Paris. In 1870 he was admitted a Fellow of the Royal Society. In 1853 he published his treatise on the *Opening of the Eustachian Tube*, then first rightly explained. On attaining the seventieth anniversary of his birthday, Dr. Jago retired from the practice of his profession.

JAHN, **FRIEDRICH LUDWIG**, known as *Turnvater Jahn*, born at Lanz, in Prussia, Aug. 11, 1778, died at Freiburg, Oct. 15, 1852. He studied theology at Halle and Göttingen, and in 1805 went to Jena to continue his studies, but soon afterward decided to enlist in the Prussian army. In 1809 he went to Berlin, and in the following year became a teacher in a gymnasium and published his *Das Deutsche Volksthum*. In 1811 he opened the first turn establishment in Berlin, and rendered the science of gymnastics so popular that it soon attracted the attention of the youth throughout the kingdom. It at once formed centers around which German patriotism gathered and developed, and its influence on the whole system of education was lasting and beneficial. In 1814 Jahn was placed in command of a volunteer corps, served in the subsequent campaigns, and entered Paris in 1815. After the war, however, he opposed the reactionary policy of the government, the turn-places became nurseries of liberal thought, and in 1818 he was seized by the Prussian government and imprisoned. He was liberated in 1825, but was not allowed to reside in any university town. He settled at Freiburg, where he wrote *Neue Runenblätter* in 1828, and *Merken Zum Deutschen Volksthum* in 1833. In 1848 he was elected to the national assembly, but took no prominent part in its deliberations.

JAIL FEVER, known also as putrid or pestilential fever, probably a severe form of typhus. Owing to improved sanitary regulations this form of disease is at present almost unknown.

JAMAICA, the county-seat and railroad junction of Queen's county, N. Y., on Long Island, 10 miles east of New York City. The chief occupations are manufacturing carriages, and market-gardening. Pop. (1890), 5,361.

JAMES, HENRY (1811-1882), an American theologian. He studied theology both in America and abroad, and became a follower of the tenets of the Sandemanian sect. For many years he resided in New York City, and for some time in Newport, R. I., but in 1866 went to Cambridge, Mass., where he remained until his death. He was a constant contributor to periodical literature.

JAMES, HENRY, an American novelist, born in 1843. He studied in the United States and in Europe, and began to write novels at an early age. In 1869 he went to Europe where he has since resided, alternating between England and Italy. Among his works are: *The Story of a Year*; *Poor Richard* (1867); *Gabrielle de Bergenac* (1869); *Watch and Ward* (1871); *Roderick Hudson* (1875); *A Passionate Pilgrim* (1875); *The American* (1878); *Daisy Miller* (1878); *The Europeans* (1878); and *Pension Beaurepas*. *The Bostonians* (1886) is one of his most popular novels.

JAMES, SIR HENRY, Q.C., M.P., born at Hereford, England, in 1828, received his education at Cheltenham College, and was called to the bar of the Middle Temple in 1852. In 1850, as again in 1851, he attained legal distinction as lecturer's prizeman at the Inner Temple. He became a Queen's Counsel in 1869, a bencher of his Inn in 1870; and in 1869 entered the House of Commons for Taunton, which he continued to represent in the Liberal interest until 1885. In 1873 he was appointed solicitor-general, and was attorney-general 1873-74 and again in 1880-85. During the latter period he introduced and carried through Parliament the Corrupt Practices act. Returned for Bury in 1885, he refused to follow Mr. Gladstone upon the Home Rule question, and since then has been one of the active leaders of the Liberal Unionist party. Sir Henry defended the case for the "Times" before the commission appointed to investigate the charge against Mr. Parnell and the Irish members.

JAMES, SIR HENRY, an English engineer and inventor, born near St. Agnes, in Cornwall, in 1803, died at Southampton, June 15, 1877. He was educated at the Royal Military Academy, Woolwich, and in 1825 passed into the Royal Engineers. In 1844 he was appointed director of the Geological Survey of Ireland, in 1846 head of the Admiralty works at Portsmouth; in 1852 director of the Ordnance Survey of the United Kingdom, and in 1857 chief of the Statistical and Topographical Department of the War Office. He was knighted in 1860, and made major-general in 1868. He is best known for his successful efforts to introduce applications of photography into the service of the exact sciences. By means of photozincography, a process which he invented in 1859, he produced fac-similes of *Domesday Book*, and of national manuscripts of England, of Scotland, and of Ireland. He is the author of several works on geology, surveying, etc.

JAMES, THOMAS LEMUEL, born at Utica, New York, March 29, 1831, was a pupil at the Utica Academy until he was fifteen years of age. Upon the formation of the Republican party Mr. James entered the new organization, and during the Fremont canvass for the presidency became sole proprietor and editor of the "Madison County Journal," which he retained for ten years. Upon the inauguration of President Lincoln in 1861 he was appointed inspector of customs. In 1874 he was made weigher, and in 1876 deputy collector of customs, in 1877 postmaster at New York city. He removed the office entirely "out of politics," making merit the only test for appointments and promotions, largely increased its revenues, introduced many mechanical improvements, and in other ways added greatly to its usefulness. President Garfield appointed him postmaster-general in March, 1881. In January, 1882, he retired from political life to accept the presidency of the Lincoln National Bank in New York city, a position which he still retains.

JAMESON, JOHN ALEXANDER, an American jurist, born in 1824. He was tutor at the University of Vermont from 1850 to 1853, and then began the practice of law in Freeport, Ill., where he remained three years. In 1856 he removed to Chicago, and from 1865 to 1883 was judge of the superior court of that city. He wrote *The Constitutional Convention: Its History, Powers, and Modes of Proceeding* (1867). He died in 1891.

JAMES RIVER is formed by the union of the Jackson and Cowpasture streams in the west of Virginia, and has its entire course in that State. It flows in a generally east-southeast direction, passing Lynchburgh and Richmond; and, widen-

ing into an estuary for the last 60 miles of its course, it falls into the Atlantic at the southern extremity of Chesapeake Bay. It is 450 miles in length, and is navigable for large steamers to City Point, at the mouth of the Appomattox. It was at Jamestown, now a ruined village on the north bank of this river, that the first English settlement in America was formed (1607). The James River and Kanawha Canal, which extends from Richmond to the White Sulphur Springs, follows the windings of the river for a considerable distance.

JAMESTOWN, the county-seat of Stutsman county, N. Dak., 93 miles west of Fargo. It is on the North Pacific Railroad and contains an insane asylum. Pop. (1890), 2,296.

JAMESTOWN, a town of Chautauqua county, N. Y., on the navigable outlet of Chautauqua Lake, 27 miles east-northeast of Corry, Pa., 20 miles southeast of Mayville, and 69 miles south by west of Buffalo. It contains several churches, national banks, and hotels, and also has a union school, the Jamestown Collegiate Institute, a piano-factory, a woolen-mill, a large manufactory of alpaca, a manufactory of tools, etc. Population in 1879, 5,336; in 1880, 9,357; in 1890, 15,991.

JAMESTOWN, a ruined village of James City county, Va., where in 1607 the first permanent English settlement was made in America. The place was burned by Bacon in 1676 and never rebuilt.

JAMNOTRI, or **JUMNOTRI**, hot springs near the source of the Jumna, or Jamuna, 10,849 feet above the sea, in lat. 30° 59' N., and long. 78° 35' E. Their temperature is 104° 7' F., nearly that of boiling water at their elevation. They are overhung by three connected mountains known as the Jumnotri Peaks, 25,500 feet high.

JANES, EDMUND STORER (1807-1876), an American Methodist Episcopal bishop. In 1830 he was admitted to the Philadelphia conference, and from 1840 to 1844 was financial secretary of the American Bible Society. In the latter year he was elected and ordained bishop, and in 1854 he visited Europe as a delegate to the British Wesleyan conference. From his election to the episcopacy until his death he resided in New York City.

JANESVILLE, a city and county-seat of Rock county, Wis., situated on both sides of Rock River, 70 miles west-southwest of Milwaukee, 13 miles north of Beloit, and 91 miles northwest of Chicago. It contains a court-house, several churches and banks, a high school, a State institution for the education of the blind, a cotton factory, woolen factories, flouring-mills, machine-shops, foundries and manufactories of farming implements, carriages, boots, shoes, etc. Population in 1880, 9,018; in 1890, 10,631.

JANET, PAUL, a French author, born at Paris, April 30, 1823, and educated at the École Normale, graduating in 1848. He was in turn teacher in the gymnasium at Bourges, and professor of philosophy in the faculty at Strasburg and of logic in the Lycéeum Louis-le-Grand. In 1864 he was elected to the Academy of Moral and Political Sciences, and since that year has lectured in the Sorbonne at Paris. M. Janet is a leading representative of modern French philosophy.

JANNEY, SAMUEL MACPHERSON (1801-1880), an American preacher and author. He was a minister of the Society of Friends, and traveled extensively in that capacity. In 1869 he was made United States superintendent of Indian affairs in the northern superintendency.

JANS, ANNEKE (1600-1663), a Dutch woman, born about 1600; came to America with her husband, Rølof Jansen. They settled in New Amsterdam, now New York, and in 1636 obtained from Gov. Wouter Van Twiller, a grant of 62 acres lying be-

tween Broadway and the North River, Jansen died soon and his widow married in 1637 Evardus Bogardus, a Dutch clergyman. Ten years later the latter was shipwrecked and drowned near the English coast. Anneke Jans obtained in 1662 from Gov. Peter Stuyvesant a patent for the farm in her own name, and this grant was confirmed by the English government in 1664. But in the meantime she had died, in 1663, leaving the estate to her eight children. In 1671 five of the heirs deeded the farm to Gov. Francis Lovelace, as representative of the proprietary, the Duke of York. In 1705 the same estate, then known as the King's Farm, was granted by the colonial government to Trinity Church, which owns the larger part of the land up to the present time.

JANSEN, KRISTOFER, a Norwegian clergyman, born in 1841. While in Norway he was interested in the movement which had in view the replacing of the Danish language, which is the Norwegian language of literature, by the truly Norwegian language, and he wrote a large series of novels in this language. In 1882 he came to this country, and settled in Minneapolis, Minn., taking charge of the Unitarian parish in that city. Among his books translated into English are *The Spellbound Fiddler*; *The Children of Hell*; and *Wives, Submit Yourselves to Your Husbands*.

JANTHINA, a genus of violet-colored ocean snails living in mid-ocean. They float on the open sea supported by a cartilaginous raft which contains numerous air-cells. Their eggs and young are attached below the float. They are carnivorous gastropods, feeding on little medusae, sea-nettles, jelly-fishes, etc. See *Britannica*, Vol. XVI, pp. 648, 651.

JAPAN. For general article on the Empire of Japan, see *Britannica*, Vol. XIII, pp. 569-595.

The total area of Japan according to the official returns of 1890 is 147,655 square miles, with a population of 40,072,020; namely, 20,246,336 males and 19,825,684 females.

In 1889 the population was divided among the various classes as follows: Imperial family, 46; kwazoku, or nobles, 3,825; shizoku, or knights (formerly retainers of the daimios), 38,074,558; common people, 1,993,637. The number of foreigners in 1890 was 9,063, of which 4,975 were Chinese, 1,701 English, 899 Americans, 550 Germans, 312 French. The number of Japanese residents abroad in 1889 was 18,688.

In 1871 the feudal system of government in Japan was entirely suppressed, the present Mikado, Mutschito, who succeeded his father Feb. 13, 1867, bent all his energies to the reconstruction of the country upon western principles, and a new era dawned for the country, which has been named *Meiji*, "the period of enlightened peace."

On Feb. 11, 1889, a constitution was promulgated, laid out on German lines, which while jealously careful of the prerogatives of the throne, established two houses, whose approval is necessary for the passage of every law, debates being held in public.

Provincial assemblies were instituted in 1879 and have been growing in importance and efficiency. For administrative purposes Japan is divided into thirty-five *Ken* or prefectures and three *fu* or city governments (Tokyo, Kyoto, Osaka). The succession to the throne has been definitely fixed on the male line. The civil list for 1889-90 amounted to 8,000,000 yen.

ARMY.—Including miscellaneous services, the total strength on the peace footing (1891) is 3,922 officers, 74,095 non-commissioned officers and men, 220 field guns, 106 mountain guns and 7,383 horses. There are besides, 4 battalions of gendarmes, of 44

officers, 927 non-commissioned officers and men; and 5 battalions of yeomanry, of 55 officers 1,995 non-commissioned officers and men. There are a staff college, military college, cadet college, military school, gunnery school, a school for non-commissioned officers, etc., with 2,360 students. The reserve has a strength of 96,845, and the *landwehr* of 70,659. All the fire-arms, ordnance, and ammunition used in the Imperial army are manufactured at the arsenals of Tokio and Osaka. The rifle now used in the army is the Murata rifle, which was invented in Japan a few years ago.

NAVY.—Japan is divided into five naval districts, each with a commander-in-chief. At present, there are only three such offices actually established, viz: at the naval port of Yokosuka in the first district, the naval port of Kure in the second, and the naval port of Sasebo in the third district.

The naval strength of Japan in 1891 consisted of 14 steel and composite cruisers (some not yet launched, however), 3 vessels for coast defense, 2 dispatch boats and 6 gunboats. She had besides, 24 first-class torpedo boats, 1 sea-going torpedo-boat, and a few yedettes, 8 unarmored ships and a few training ships. There were 13 admirals, 618 officers, 134 engineers, 57 constructors, 136 surgeons, 140 commissariat officers, and 10,370 men.

MERCHANT MARINE.—In 1890 the merchant navy of Japan consisted of 1,407 vessels of European build, of 141,144 tons, 564 being steamers, and 1,091 native craft above 50 tons.

Of the total foreign ships entered, 429 of 660,862 tons were British; 290 of 206,941 tons German; 80 of 141,576 tons American; 33 of 69,619 tons French; 36 of 20,204 tons Norwegian; 25 of 82,426 tons Russian; 3 of 3,257 tons Chinese. Of the total shipping 679 vessels of 648,070 tons entered Nagasaki; 232 of 397,114 tons Yokohama; 206 of 309,707 tons Kobe.

COMMERCE.—The value of the commerce of Japan for 1890 was: Imports, 81,670,354 yen; exports, 55-791,847. The foreign commerce of Japan is carried on through the open ports of Yokohama, Kobe, Osaka, Nagasaki, Hakodate and Niigata. The exports of bullion and specie in 1889 amounted to 5,188,529 yen and the imports to 14,173,245 yen.

INTERNAL COMMUNICATIONS, ROADS.—In 1891, Japan had 5,000 miles of state roads and 16,490 miles of provincial highways.

RAILWAYS.—Railways are of two classes—(1) State railways; (2) railways owned by private companies, fourteen in number, guaranteed a certain rate of interest by government. In 1891 there were 541 miles of the former which carried 644,222 tons of merchandise and 11,265,383 passengers, and 586 of the latter which carried 518,527 tons and 9,333,553 passengers.

POSTAL SYSTEM AND TELEGRAPHS.—A steady increase in the figures of these departments of the government is observable from 1885 to 1890. During the year ending December 31, 1890, 154,441,419 letters, 27,066,852 newspapers and 1,986,437 books passed through the mails, while the income of the postoffice for the same period amounted to 3,882,825 yen, the expenditures, however, exceeding the income by nearly a million yen.

All open ports and other important cities and towns are connected with each other and with Europe by lines of telegraph. There were telegraphs of a length of 6,995 miles (the length of wires 19,788) in 1890. The number of telegrams carried was 3,306,614 in the year 1889. There were 309 offices in Japan.

In 1891 there were 668 miles of telephone wire, with 28 offices and 396 subscribers.

FINANCES, PUBLIC.—The national debt of Japan stood as follows in April, 1890. Home debt: $7\frac{1}{2}$ per

cent., 10,000,000 yen; 7 per cent., 40,426,885 yen; 6 per cent., 46,736,485 yen; 5 per cent., 134,882,145 yen; 4 per cent., 10,551,275 yen; no interest, 7,022,544 yen; total, 249,619,334 yen. Foreign debt: 7 per cent., 5,826,232 yen. Total, 255,445,566 yen. Paper currency, 40,065,256 yen.

The estimated revenue of Fu and Ken for 1890-91 is 15,081,130 yen, and expenditure 14,965,751 yen. The treasury is to grant to local governments 1,266,280 yen. The actual revenue for 1888-89 of Ku, Cho, and Son was 13,256,833 yen, and expenditure 12,700,039 yen.

In 1889 the Nippon Ginko, or Bank of Japan, had a paid-up capital of 10,000,000 yen; notes in circulation, 74,297,005 (in 1888, 64,132,846); deposits, 31,874,301 (in 1888, 26,238,867); loans, 17,846,702 (in 1888 22,713,994). The Kokuritsu Ginko (134), paid-up capital, 47,681,379 yen; notes in circulation, 26,710,403 (in 1888, 27,645,771); deposits, 33,882,604 (in 1888, 33,526,628); loans, 68,238,894 (in 1888, 59,404,813). The Shokin Ginko, or Specie Bank, paid-up capital, 4,500,000 yen; deposits, 7,143,154 (in 1888, 15,471,933); loans, 4,253,785 (in 1888, 3,948,855).

At the end of 1889 there were 218 private banks, with capital 17,472,170 yen. In 1889, 67,198 persons deposited 6,449,961 yen, and withdrew 3,903,130 yen during the year from the Kokuritsu Ginko, which does business also as savings-banks. In the same year 762,869 persons deposited 31,284,400 yen (in 1888, 665,822 persons deposited 28,966,947 yen), and withdrew 10,843,122 yen during the year from the post-offices, which act as savings-banks.

As before intimated, the progress which has been made by the Japanese in the civilization of the West is very remarkable. Young men of exceptional promise have been sent to the great universities of Europe and America, to return, upon the completion of their education, and mingle with the people as a leavening factor of the most potent quality. The empress and her suite have recently adopted foreign costume, being followed to a certain extent by the fashionable ladies of the capital. Japan's expeditions to Formosa to punish piracy, her annexation in 1879 of the Loo Choo Islands, notwithstanding China's remonstrances and threats, her spirited policy in Corea in 1873 and again in 1882, her conscription law of 1883 and subsequent army reorganization, her development of a strong navy, her coast defense scheme of 1887, subscribed to liberally by wealthy private individuals, sufficiently attest the nation's assertive spirit. While so hurried an assimilation of western ideas as was made necessary owing to her complete previous isolation has undoubtedly been accompanied by numerous minor imprudences and extravagances; yet through it all the patriotic spirit of the nation has triumphed, and her administration may now (1893) be said to be in a highly satisfactory condition. During the past few years, especially since the promulgation of the popular constitution in 1889, the court has emerged entirely from its seclusion. Education is general and compulsory. There is a complete system of local elementary, middle and normal schools and a central university in the capital, with five higher middle schools as feeders. There is also a higher normal school at Tokoyo. Education is perfectly free from class restrictions. The printing press is very active and newspapers are astonishingly cheap. The Japanese police is a most efficient force. The convict system is an excellent one and the establishments are so conducted as to be a source of revenue to the government. Penal and civil codes have been drafted on a European basis. Taxation mostly falls upon the land. Mean solar time for 135° long. or 9 hours E. of Greenwich, has been adopted.

The United States, perhaps, of all the nations of the earth, entertains for Japan the most sincere feelings of friendship. The way in which she has struggled to attain to the standard of Western civilization, so that she might acquire the coveted position of equal among the best, has constituted a strong and pathetic appeal to the democracy of America. From a feudal despotism she has become a constitutional government; she has produced a code of laws in harmony with that constitution. She is educating her judges and fitting them for the highest judicial functions. She grants by that constitution civil and religious liberty to all her subjects. There is a growing feeling in this country that the foreign treaties of the great powers with Japan should be revised, and that the judicial and tariff autonomy which was taken from her in the days of her weakness and ignorance, should be restored.

In 1887 the negotiations for a revision of the treaties were broken off, owing to an outbreak of popular dissatisfaction with the guarantees demanded by the seventeen foreign powers acting in concert. This breakdown was followed by a distinct conservative reaction in the nation, in no way seriously affecting the steady progress of Western institutions, but marking a more cautious attitude and a more critical spirit. In the spring of 1889 the combination of treaty powers was broken through by the action first of the United States and then of Germany and Russia, who formed treaties on their own account, abolishing extra-territoriality and sanctioning mixed residence under certain mild restrictions. These treaties were to come into force in 1890. Mexico, not a treaty power, had also arranged an independent treaty in November, 1888. Other powers prepared to follow. But a strong opposition having sprung up, the Kuroda cabinet found itself unable to carry out the scheme, and treaty revision was once more shelved. This is the close of the first epoch in the modern history of Japan, following on the heels of the promulgation of a popular constitution, Feb. 11, 1889.

On April 18, 1892, the mikado appointed a committee of seven members to report a draft of a revision of the treaties between Japan and the Western powers.

In no one respect, has Japan shown herself better entitled to be ranked among the more civilized nations of the earth than in the improved condition of her female population, but still much remains to be desired. The attitude assumed by the empress and the imperial princesses is rapidly bringing about an equality in the sexes. Divorces, however, are very easily obtainable, and the nuptial tie is little respected among the lower classes. Sir Edwin Arnold, commenting on the condition of Japanese women, says (1892):

"The Japanese women belong throughout their career to some man or other—first their father, next their eldest brother, afterward their husband and his male relations. They hardly ever hold property, since the family is perpetuated along the male line only, and the real and personal estates pass to the boys. They have little or no voice in choosing their husbands, yet take one they must before they are twenty years old, but that husband, whom they have not wanted, has an almost unquestionable right to divorce his wife upon the smallest reason or for none at all. Out of 500 marriages, 200 at least end in some sad and capricious separation; for the husband can get rid of his wife on the ground of too much gossiping or because of disagreement with the mother-in-law; and the worst of it is that the children afterward belong to him exclusively."

JAPAN, GREAT EARTHQUAKE IN. On Oct. 28, 1891, one of the severest earthquakes ever known in Japan occurred. Without any previous warning shocks were felt from Tokio to beyond Kobe, a distance of more than 500 miles. The damage done in Tokio and Yokohama was very slight and no lives were lost, but as the rumbling and roaring of the earthquake gradually passed these cities, it seemed to gather strength, and at Nagoya, Gifu and Ogaki the damage done was severe indeed.

The city of Nagoya, with a population of 165,000 and 40,000 houses, was almost totally destroyed. According to the police reports, it lost 2,007 in killed and 2,158 wounded, with a total destruction of 31,764 houses. Gifu, with a population of 28,000 and 7,000 houses, lost in killed more than 2,000 and about an equal number wounded, with the total destruction of more than one-half of the city; of the remaining half, the streets were so badly littered with the debris caused from above and below, that it is doubtful if the city can ever be rebuilt. Ogaki, with a population of 20,000, lost in killed 1,000 (estimated) and in wounded about an equal number, with the almost complete destruction of the city; in fact, only four streets are said to remain, the others being completely upheaved and filled with wreckage. The Imperial Arsenal, situated in Osoka, and the electric-light works were wrecked and the Naniwa cotton mills, employing 700 operatives, were destroyed, but fortunately only 23 lives were lost and 45 persons injured, the remainder of the workmen having gained the open street before the buildings collapsed. Great damage was done to the railway and telegraph lines, an iron bridge over the Nagara-gawa River being demolished.

Near Lake Biwa saline water was forced from the earth, and rose to a height of several feet; but the flow soon ceased from these cracks. Immediately following the convulsion the water in Owori Bay became greatly agitated, the waves rising to an unusual height and seeming to flow from all directions, causing the wreck of a great many junks and other vessels. The bay continued very rough for two days following the disturbance, and steamers usually plying on it remained at anchor rather than attempt to get out to sea.

Near Hamamotsu the railway sank several inches for a space of more than five miles, and at Maizaka it settled down more than twelve inches. The entire roadbed had to be relaid in a great many places, and none of the bridges were regarded as safe until the government engineers had inspected them. Much loss of life and property was experienced at all the small cities and villages lying in the path of the earthquake, but were no trustworthy returns ever received from them. It is thought that more than 10,000 lives were lost with fully double this number in wounded. The shock was the severest felt since 1854 and 1855. In 1854 the city of Simoda was destroyed, and the resulting tidal wave swept a Russian frigate from her anchorage a couple of miles over the land. In the earthquake of 1855 the city of Tokio suffered severely, a large part being destroyed and several thousand lives lost.

JARVES, JAMES JACKSON, born at Boston, Mass., August 20, 1818; served as United States consul in Honolulu, and established a newspaper there. He published a history of the Sandwich Islands, and having traveled extensively in Europe produced *Art Hunts and Art Studies*, being critical considerations of famous pictures and statuary. He died in Switzerland, June 28, 1888.

JARVIS, EDWARD, born at Concord, Mass., Janu-

ary 9, 1803; graduated at Harvard in 1826, and practiced medicine in Massachusetts, where he became well known as an authority on insanity.

JASPER (Gr. *iaspis*), a mineral generally regarded as one of the varieties of quartz, and distinguished by its opacity, owing to a mixture of clay or other substances with the silica of which it is chiefly composed. There are many kinds of jasper, some of them of one color, as brown, red, yellow, green, white, blue, or black, and some variously striped, spotted or clouded with different colors. Jasper is a very abundant mineral; it is found in veins and imbedded masses in many rocks, sometimes appears as a rock of which whole hills are formed, and is very common in the shape of pebbles. It has been prized from the most ancient times for ornamental purposes, as it takes a high polish.

JASPER, the county-seat of Dubois county, Ind., situated on the Patoka River. Block coal is mined here, and lumber, flour, carriages, and farm implements are manufactured. Pop., 1,281.

JASTROW, MARCUS MORDECAI, a Polish-American rabbi, born at Rogasen, Prussia, in 1829. After studying at Berlin and graduating at Halle, he became preacher and assistant rabbi at Warsaw in 1858. Being banished in 1862 he became rabbi at Mannheim, but was soon recalled to Warsaw, where he remained till 1864. In 1866 a German-Hebrew congregation called him to Philadelphia, Pa., where he has since acted as rabbi.

JATAKA (literally 'relating to birth'), the name of a collection of legends, containing an account of the 550 previous births of Sākya Muni, or the Buddha. It forms a part of the *Suttapiṭaka* of Pali literature. These are of great importance as the earliest collection of popular stories.

JAVELIN, a short spear intended to be thrown by the hand. It was anciently used by horsemen and foot soldiers, and is a common weapon among modern savage tribes.

JAY, BLUE JAY, one of our most common and most noxious birds. It is in the habit of destroying the broods of other small birds, and commits depredations on the fruits and seeds of farms and gardens. Both the European and American jays are fully described in *Britannica*, Vol. XIII, pp. 610, 611.

JAY, JOHN, an American diplomatist, born in 1817. He was admitted to the New York bar in 1839, and in 1869 was sent as minister to Austria. He resigned in 1875, and in 1877 was chairman of the commission to investigate the system of the New York custom-house. Mr. Jay is a member of various geographical and historical societies, and has published many speeches and pamphlets.

JAY, WILLIAM (1789-1858), an American jurist. In 1818 he was appointed to the bench of Westchester county, N. Y., and was reappointed until 1843. He was active in anti-slavery and temperance movements.

JEAFFERSON, JOHN CORDY, an English author, born at Framlingham, Suffolk, in 1831. Beginning the practice of law in 1859, he was employed in 1874 as one of the inspectors of records in various parts of England. He has published a long series of novels of which the most notable is *Not Dead Yet*, partly occasioned by the famous Tichborne case.

JEBB, RICHARD CLAVERHOUSE, a distinguished Greek scholar, born at Dundee, Scotland, Aug. 27, 1841. He passed with marked distinction through St. Columba's College, Dublin, Charterhouse School, London, and Trinity College, Cambridge, graduating as senior classic in 1862. Soon after he was elected Fellow of his college, and took a prominent part in organizing the system of inter-collegiate classical lectures, and served as secretary of the

newly founded Cambridge Philological Society. In 1869 he became public orator of the university, in 1872 classical examiner in the university of London, and tutor of his own college, in 1875 professor of Greek in the university of Glasgow, and in 1889 regius professor of Greek at Cambridge. He has received from the King of Greece the Gold Cross of the Order of the Savior, in recognition of his services in promoting the study of both classical and modern Greek. Among the most important of his works are *The Attic Orators*, *Modern Greece*, and a *Life of Richard Bentley*. Dr. Jebb has for some time past been engaged in editing the complete works of Sophocles.

JEFFERSON, a railroad junction and the county-seat of Greene county, Iowa, on Coon River, 50 miles northwest of Des Moines. Pop., 1,875.

JEFFERSON, a dairying and farming town of Schoharie county, N. Y. It has manufactories of cabinet-wares and shoes. Pop., 225.

JEFFERSON, a city, railroad center and county-seat of Marion county, Tex., at the head of navigation on Big Cypress Bayou. It is a thriving manufacturing city, the largest of northeastern Texas, and the center of river commerce, exporting cattle, barreled beef, tallow, hides, wool, osage orange seed, and large quantities of cotton. Large beds of coal and iron are found in the vicinity. Population (1890), 3,072.

JEFFERSON, a post-village, capital of Ashtabula county, Ohio, situated on the Franklin division of the Lake Shore Railroad, 13 miles south of Lake Erie. It is surrounded by a rich grazing and dairy country.

JEFFERSON, a city and county-seat of Jefferson county, Wis., situated at the union of Crawford and Rock rivers. It is the seat of Jefferson Liberal Institute, and has manufactories of cream-brick. Pop. (1890), 1,346.

JEFFERSON CITY, the capital of the State of Missouri, and the county-seat of Cole county, situated on the south bank of the Missouri River, 150 miles from its mouth—lat. 38° 36' N., long. 92° 9' W. It is 125 miles west of St. Louis, and 158 miles east-southeast of Kansas City. Jefferson City contains a state-house, a court-house, a state-prison, the Lincoln Institute, a female seminary, several banks and churches, and manufactories of farming-implements and wagons. Coal and limestone are found in the vicinity. Population in 1870, 4,420; in 1880, 5,271; in 1890, 6,732.

JEFFERSON, JOSEPH, an American actor, was born in Philadelphia, February 20, 1829. His grandfather and great-grandfather were distinguished actors, and his mother, Mrs. Burke, was a celebrated vocalist. He appeared on the stage at a very early age in the character of the child in *Pizarro*, or *the Death of Rollo*, and in 1843 traveled through Mexico and Texas with a company of strolling players. He soon rose to the front place as a comedian, and his merits are recognized in both England and America. His range of characters is very wide, covering almost the entire field of comedy and farce, without degenerating into burlesque. His most famous rôle is that of *Rip Van Winkle* in Mr. Dion Bouicault's play of that name, founded upon the story by Washington Irving; a character which Mr. Jefferson may be said to have created, as well as to have made his own. Perhaps he is equally successful as "Bob Acres" in *The Rivals*. Besides playing in every city in the United States he has made professional visits to England and Australia. His son, Joseph Jefferson, Jr., is also an actor of decided ability.

JEFFERSONVILLE, a city of Clark county, Ind., on the Ohio River, opposite Louisville, Ky., 5 miles

above New Albany, and 108 miles south of Indianapolis. It contains several churches and banks, the Southern State prison, an arsenal, high-school, iron foundries, machine-shops and manufactories of railroad-cars, steamboats, farm-implements, etc. Population in 1880, 9,357; in 1890, 11,274.

JENKINS, JAMES G., an American jurist, is connected with General Worth of Mexican war fame. He was born at Saratoga Springs, New York, Jan. 18, 1834. His mother was the eldest child of Reuben H. Walworth, the last chancellor of New York State, and a jurist of national reputation. Mr. Jenkins was educated for the bar in his own State, and in 1855 was admitted to practice before the Supreme Court of the United States. He went to Wisconsin in 1857 and for many years was a successful practitioner there. He succeeded Judge Andrew J. Miller, on his death, on the bench of the United States District Court, in 1885. In March, 1893, he was appointed by President Cleveland to fill the place made vacant by Judge W. Q. Gresham, on the bench of the Seventh Circuit Court of the United States, on that gentleman's acceptance of the portfolio of Secretary of State in the Cleveland cabinet.

JENKINS, EDWARD, a British author, born in 1838. He was admitted to the bar in London in 1864, and practiced till 1873, when he entered politics. From 1874 to 1876 he was agent-general for Canada, and then became a member of parliament. Among his published works are *Gin's Baby* (1870); *The Colonies and Imperial Unity* (1871); and *The Coolie* (1871).

JENKINS, THORNTON ALEXANDER, a United States naval officer, born in 1811. He entered the navy in 1828 as a midshipman; was made a lieutenant in 1839; was engaged in several important actions during the Mexican war; in 1852 became secretary of the light-house board; was promoted commander in 1855; was made captain in 1862; commodore in 1866; and rear admiral in 1870. He was retired in 1873, and at the Centennial Exhibition at Philadelphia in 1876 had charge of the exhibit of the naval department. Admiral Jenkins wrote many reports for the Government.

JENNER, SIR WILLIAM, an English physician, born at Chatham in 1815, and educated at University College, London, where he himself was professor from 1848 till 1879. He was elected fellow of the Royal College of Physicians, and appointed to deliver the Gulstonian Lectures before the college in 1852. On the death of Doctor Baly, in 1861, Doctor Jenner was appointed to succeed him as physician extraordinary to the queen, and in 1862 was gazetted physician in ordinary. In 1862 he became professor of the principles and practice of medicine at University College, and in 1863 physician in ordinary to the prince of Wales. On his appointment as physician to the queen, he resigned his connection with the London Fever Hospital, and in 1862 resigned the post of physician to the Hospital for Sick Children. In 1864 he was elected a fellow of the Royal Society. He has written several series of papers on fever, the acute specific diseases, diphtheria, diseases of children, diseases of the heart, lungs, skin, etc. He was created a baronet in 1868, and made a K.C.B. Jan. 20, 1872, in recognition of services rendered during the severe illness of the Prince of Wales. Sir William Jenner was elected president of the College of Physicians in 1881.

JERROLD, WILLIAM BLANCHARD, an English author, born in London in 1826, died in 1884. After being educated partly in France, he became a journalist, and also produced many farces and comedies. In 1855 he attended the Paris exhibition as agent of the London "Daily News." In 1862 he

wrote a series of articles on the "London poor" for the "Morning Post," and during the next year he went to Paris to examine its institutions for the poor, and some years later he visited the Netherlands for the same purpose. Among his published writings are, *At Home in Paris; Trip Through the Vineyards of Spain; The Cocaynes; London*, illustrated by Doré, and *Life of Napoleon III.*

JERSEY CITY, a city and county-seat of Hudson county, N. J., on the right or west bank of the Hudson River, opposite New York City, with which constant communication is maintained by five ferries. The streets are generally laid out at right angles, and are of good width, well paved, sewerage, lighted with gas and electricity, and bordered by many handsome residences. The most prominent public buildings are the city-hall, court-house and schoolhouses. Jersey City is the terminus of the Red Star line of steamships to Europe, and of a dozen railroads running in various directions. Immense quantities of iron, coal, produce, and general merchandise are brought to and shipped from this city. There are horse and electric railroads to Hoboken and various parts of the city itself. It contains upwards of 60 churches, a high-school, a normal-school, several banks, and many charitable and educational institutions. The city is supplied with water conveyed in pipes from the Passaic River by means of hydraulic works which are at Belleville, six miles distant. Jersey City has many and various manufacturing establishments, among which the more important are the works of a large watch company, several extensive glass-works, crucible-works, steel-works, foundries, machine-shops, boiler-works, locomotive and railroad supply works, sugar refineries, zinc-works, breweries, planing-mills, potteries, manufactories of chemicals, jewelry, fire-works, lead pencils, candles, soap, hydrants, chains, rubber goods, castor and linseed oil, copper ware, oakum, chains and spikes, car springs, etc. European markets, as well as those of this country, obtain their crucibles from the works of Jersey City. There are also large stock-yards and an extensive *abattoir* where vast quantities of cattle and sheep are slaughtered for the New York markets. This city is governed by a mayor and board of alderman, assisted by numerous executive boards. There is an efficient police force, and a well equipped fire department. Public education is directly controlled by a board of education, who elect a city superintendent. The site whereon Jersey City stands was formerly called Paulus Hook, but in 1820 was chartered as "The City of Jersey," and in 1838 as "Jersey City." Population in 1850, 6,856; in 1860, 29,226; in 1870, 82,546; in 1880, 120,722; in 1890, 163,987.

JERSEY SHORE, a post-borough of Lycoming county, Pa., 10 miles southwest of Williamsport, on the west branch of the Susquehanna. The region has fine scenery, is fertile and produces lumber and tobacco. Pop. (1890), 1,853.

JERSEYVILLE, a city, railroad junction and county-seat of Jersey county, Ill., 50 miles north of St. Louis. It manufactures flour, plows, reapers, and carriages. Pop. (1890), 3,207.

JESSEL, SIR GEORGE, an English jurist, born in London, of Jewish parents, in 1824, died March 21, 1883. After studying at the University College, London, he was called to the bar at Lincoln's Inn in 1847, and in 1865 he became a queen's counsel. In 1871 he was appointed solicitor-general by Mr. Gladstone, knighted in 1872; made master of the rolls in 1873, and became the usual president of the court of appeals. He was the first Jew to hold a judicial office in England. In 1880 Jessel was made vice-chancellor of the University of London.

JESUITS IN NORTH AMERICA. On *Jesuits* in general, see *Britannica*, Vol. XIII, pp. 645-656. In 1611 the Jesuit Fathers Biard and Masse accompanied the French expedition which laid the foundation of Acadia. Called upon by the original Recollet missionaries to take part in their labors in the then new colony of Quebec, the Jesuits settled in the valley of the St. Charles, near the confluence of that river with the Lairet, and there established the nursery of their order in America known as Notre-Dame des Anges, in 1625. When Quebec was captured by the English, four years later, the Jesuit mission was suspended and the fathers driven off. In 1632 when the French recaptured the St. Lawrence River, the Jesuits returned, opened schools; established the College of Quebec, and sent out missionaries, who went up the river in canoes. After many hardships and a journey of 900 miles by land and water, the missionaries found themselves in the Huron country, near the shores of Lake Huron. Here they founded mission schools, preached, farmed, and traded in furs with the French of Montreal and Quebec. In the year 1649 the Iroquois conquered the Hurons, burnt their villages, devastated their corn-fields, took their women and children prisoners, and burnt and tomahawked the Jesuit fathers.

But the Jesuits did not give up the task of establishing missions among the Indians. In 1649 they had establishments at Montreal, Three Rivers, and Quebec, a missionary post on the island of Miscon, in the gulf of the St. Lawrence, another at Tadousac near the mouth of the Great Saguenary River; and also posts along the Algonquins on the Kennebec River in Maine. Besides their activity as missionaries we find the Jesuits in North America taking part in many exploring expeditions. In 1671, when the Intendant Talon of New France resolved to take possession of the large valley of the Ottawas, in the name of the King of France, the Jesuit Father Claude Allouez assisted him very materially, and took the chief part in the ceremonies incident to the great meeting of Indian tribes at Sainte-Marie-du-Sault. In the following year the French, under St. Simon and the Jesuit Father Albanel, re-discovered Hudson's Bay.

Talon also sent in the same year a Quebec merchant named Joliet, and the Jesuit Father Marquette west to discover "Cathay" and the "South Sea." After wintering at Machelimackinac, these two explorers advanced early the next spring into the valley of the Illinois River, passing by way of the Fox River and the Wisconsin into the Mississippi as far as its confluence with the Arkansas. They returned in the fall and wintered at St. Francis Xavier, a missionary station on the west of Lake Michigan. As La Salle descended the Mississippi to the gulf in 1681, we see that Marquette and Joliet preceded him by eight years in discovering "Father of Waters."

For the next hundred years the Jesuits continued their missionary, farming, teaching and exploring work with undiminished zeal and gratifying success, so that in 1720, when Charlevoix, a member of their society, visited Canada, he was prompted to congratulate his brethren warmly on their eminent services. But the English were at war with the French everywhere. So it came that Father Sebastian Rasle was shot down on the battle-field at Norridgewock, Maine, surrounded by his Indian neophytes; and when in 1769 the British conquered New France, the College of Quebec, after flourishing for nearly 150 years, received its first severe blow. But it was still further crippled in 1773, when Pope Clement XIV. suppressed the whole Jesuit order by a papal bull. Father Well, the last Jesuit

survivor in Montreal, died in 1791; and Father Cazot, the last one in Quebec, passed away in 1800. After this the British government took all the Jesuit property in Canada, and turned the College of Quebec into barracks. It served as such until 1869, when England withdrew her troops from Canada. In 1880 the college building was torn down by order of the Provincial government. At present, the Jesuit property at Quebec, Three Rivers, Montreal and elsewhere, summing up thousands upon thousands of acres, is under litigation between the Dominion government and the Pope in Rome.

The work of the Jesuits begins in the United States when it ends in New France. After the war of independence, Father John Carroll, an ardent Jesuit in Maryland, corresponded with the Holy See with a view to establishing a hierarchy in the United States. His scheme was accepted, and he himself was appointed and consecrated first bishop of Baltimore in 1790. The diocese of Baltimore remained for years the only Roman Catholic diocese in the United States, and embraced all the States and Territories of the Union. Carroll was the founder of Georgetown College, near Washington, in 1791, and he established a theological seminary in connection with this college, which in 1792, was merged in that of St. Mary's, Baltimore. In 1815 Georgetown College was chartered as a university by act of Congress, and in 1833 it was empowered by the Holy See to confer degrees in philosophy and theology. This university is at present the largest school under Jesuitic control in the Union, and withal one of the best in the land. One of its principal offshoots is the college of the Holy Cross, at Worcester, Mass.

In 1823 two Jesuits from Maryland traveled to Missouri and took 10 young Marylanders with them. At Florissant, a few miles north, northwest of St. Louis, Mo., they opened a school for Indian boys. In 1828 the Missouri Jesuits founded the St. Louis University, which was the first scholastic institution west of the Mississippi, and stands to-day high on the roll of American schools. Similar schools were gradually established by the Missouri fathers in Cincinnati, O.; Louisville and Bardstown, Ky.; Grand Coteau, La.; Chicago, Ill.; Milwaukee, Wis.; Detroit, Mich., and Omaha, Neb. They have also auxiliary stations in all the important towns of the West.

In their efforts to convert and civilize the Indians the Jesuits penetrated into the various Indian countries, beginning with the Pottowatomies in Kansas, ascending the Missouri to the Sioux encampment, and the Yellowstone to the Blackfeet. They labored among the Flatheads and the various other tribes of Indians west of the Rocky Mountains. One of them, Father De Smet, was on several occasions deputed by the United States Government to pacify the Indians when they became violent by their unjust treatment at the hands of Indian agents or swindling traders. Father De Smet visited many of the tribes, and obtained from the government even the right of nominating agents for Catholic tribes.

During the revolutionary troubles in Europe in 1847-48, many Jesuits were driven from their colleges and sought refuge in America. The provinces of Maryland and Missouri obtained large reinforcements from the refugees. A number of the latter went to California in 1854, and began there a mission and a school, the college of Santa Clara, near San Francisco. The mission has since spread into Oregon and New Mexico. Some French Jesuits took possession of St. Mary's College, Marion county, Ky., in 1833, and laid also the foundation

of another college in Louisville, Ky., in 1845. Early in 1846 they left the latter to take charge of St. John's College, N. Y., and also to establish a college for externs in New York City. About the same time a number of Jesuits went to New Orleans, where they opened a house, and took soon after also the flourishing college of Springhill, near Mobile, Ala. They have since added several stations throughout the Southwest.

The order of Jesuits was restored in 1814 by Pope Pius VII. After an absence of more than 40 years from Canada, the Jesuit fathers appeared once more on the banks of the St. Lawrence, in 1839; and the old College of Quebec was soon replaced by St. Mary's College at Montreal, which stands unrivaled among the many flourishing institutions in Canada. In 1865 the Jesuits opened their beautiful church in Montreal, which is the counterpart of the Gesù, the mother temple of their society in Rome. In 1885 the College of St. Boniface, opposite Winnipeg, in Manitoba, was transferred to the Jesuits of the Dominion.

The preceding array of facts shows that the Jesuits of America represent a large percentage of the whole number of educational institutions, both in the United States and the Dominion of Canada. And we may add that their schools and colleges are generally crowded with students. Taking priests, scholastics, novices and lay-brothers together, they number about 1,000 men. But the mental and moral influence on the large number of their pupils can scarcely be estimated. The recruits of their order are taken from the most gifted and promising native American youth. At Woodstock, Md., a central institute has been established in which young Jesuits are thoroughly instructed in philosophy, physical science, mathematics, and theology, with a view of preparing them for the priestly offices, and also for teaching all the higher branches of learning in the colleges and schools of their order.

JETTIES are pier-like structures of wood or stone and earth built on either side of a river's mouth in order to contract its current and to cause it to scour away the mud and sand of the bar, thus deepening the channel. Many of the river-mouths along our great lakes have been converted into good ports by harbor-works embodying the jetty system, but the most conspicuous examples of this kind of river engineering are Captain J. B. Eads' jetties at the mouth of the Mississippi River. For the details, see *MISSISSIPPI, Britannica*, Vol. XVI, pp. 520, 521, and *RIVER ENGINEERING*, Vol. XX, p. 571.

We add the following remarks: Eads built two jetties along the South Pass. The east jetty is 12,100 feet long, the west one is somewhat shorter. They consist mainly of willow-matresses. The willows for these mattresses were obtained in large quantities from the "jump," a sub-delta 12 miles above the head of the passes. Willow rods $2\frac{1}{2}$ inches thick at the butt and from 15 to 30 feet long were used, and the brushy tops left on them. Barges carried them to Port Eads, a town of small houses built just above the mouth of the South Pass on both banks of the latter. The mattresses were about two feet thick and many of them as much as 100 feet long. They were towed by a steam-tug to their places, and were sunk there by placing rubble stones evenly upon them. These stones had to be brought down the Mississippi from quarries at Rosiclair, in southern Illinois. Guide-piles marked out the course of each jetty. For the greater part of their length four courses of mattresses and stones were laid. Towards the seaward ends the works were protected by cribs of palmetto logs filled in

with stone; and towards the landward end some portions were constructed of yellow pine sheet piling. But as the current tended to undermine the latter part of the work, it had to be protected by willow mattresses lowered between the rows of piles. Afterwards "an inner east jetty" was built to reinforce the landward end of the east jetty.

The west jetty is connected with the main land by a dam of willow mattresses 550 feet long and running at right angles with the main work. After both jetties were constructed, temporary wing-dams were built inside to hasten the erosive action of the current, and they served their purpose well. Three years after the jetties were laid, when all the work was well settled together, their tops were capped toward their seaward ends with huge blocks of concrete, and their sides were protected with a revetment of stone and gravel. The jetties are still slowly settling, and a slight shoaling to seaward is reported. But the entire pass is now all along at least 30 feet deep.

JEVONS, WILLIAM STANLEY, an English political economist, born at Liverpool in 1835, died in 1882. After being educated at the University College, London, he spent five years at Sydney, Australia, as an employé in the mint there. In 1866 he was appointed professor of logic, political economy, and mental philosophy at Owen's College, Manchester. In 1875 he became professor of political economy at University College, London. After 1881 he devoted himself entirely to literary work, but was accidentally drowned at Bexhill in 1882.

JEWELL, MARSHALL, born in New Hampshire, Oct. 20, 1825; died in Connecticut, Feb. 10, 1883. He engaged in business with much success, and in 1869 was elected governor of his State. Defeated the following year, he was again successful in 1871 and 1872. In 1873 he was sent as minister to St. Petersburg, and in 1874 returned to become postmaster-general. He resigned this position in 1876, being dissatisfied with the treatment accorded to Benjamin H. Bristow, whose candidacy for the presidency Mr. Jewell strongly favored. In 1880 he was chairman of the Republican national committee.

JEX-BLAKE, THOMAS WILLIAM, D.D., an English scholar and ecclesiastic, was born in London, January 26, 1832. He graduated with honors at Oxford, in 1855, and was elected a fellow of Queen's College in the same year. He became head master of Rugby School in February, 1874, a position which he resigned in 1886. He is the author of *Long Vacation in Continental Picture Galleries*, and of numerous literary articles which have been published in the magazines and high-class periodicals. He issued a volume of sermons entitled *Life by Faith* in 1875.

JOACHIM, JOSEPH, a celebrated violinist, born in Hungary, of Jewish parents, July 15, 1831; entered while very young the Conservatory of Music at Vienna, where he studied under Joseph Böhm. From the age of twelve years he attracted much attention at Leipsic by his rare skill on his instrument. He assiduously pursued his studies under the guidance of Ferdinand David, and also received lessons from Moritz Hauptmann. In 1850 he paid his first visit to Paris, and in the same year was appointed director of the concerts at Weimar. In 1853 he became master of the Chapel Royal at Hanover. After this he appeared in most of the capitals of Europe, and paid annual visits to London, where he gave several series of concerts. In 1869 he became a member of the senate of the Berlin Academy, and was nominated director of the school of instrumental music in the Conservatory of Music then recently established in the Prussian capital. He was

created an honorary Mus. Doc. of the University of Cambridge, March 8, 1877. Herr Joachim's fame rests mainly on his extraordinary skill as an instrumentalist. As a composer he belongs to the school of Schumann. The *Concert à la Hongroise* is one of his chief compositions for violin and orchestra. In August, 1882, he was appointed conductor of the Royal Academy of Music at Berlin, and musical director of the Royal Academy of Arts.

JOAN, POPE, a fabulous personage long said to have filled the papal chair as John VIII., for about three years after the death of Leo IV. in 855. According to the latest and accepted form of the story, she was daughter of an English missionary, and was born at Mainz or Ingelheim. Forming an illicit connection with a monk at Fulda, she put on male attire and fled with him to Athens, where her lover soon died. She then came to Rome, where from her remarkable learning she became in quick succession notary to the curia, cardinal, and pope, until her sex was discovered by the premature and public birth of a child during a solemn procession. The story is an absolute falsehood; no more to be considered seriously than *Puss in Boots*.

JOHNSON, BUSHROD R., born in Ohio, October 7, 1817; died, September 11, 1880. He graduated at West Point in 1840; served in the Seminole and Mexican wars, and became superintendent of the Western Military Institute of Kentucky. In 1861 he entered the Confederate service, was taken prisoner at Fort Donelson, commanded a division at Chattanooga, and was promoted major-general in 1864. He was afterward chancellor of the University of Nashville.

JOHNSON, CAVE, born in Tennessee in 1793; died there in 1866. He became a circuit judge, was elected to Congress as a Democrat, and served from 1829-37 to 1839-45. In the last named year he became postmaster-general in Polk's cabinet, and from 1850 to 1859 he was president of the Bank of Tennessee. He supported the Union cause during the Civil war.

JOHNSON, EASTMAN, American artist, was born at Lovell, Maine, July 29, 1824. From the age of seventeen he devoted himself to art work, and in 1849 went to Düsseldorf, where he studied two years, and afterwards resided for four years at the Hague, where, besides numerous portraits he executed *The Savoyard* and the *Card Players*, his earliest elaborate pictures in oil. After visiting the principal European galleries, he established himself in Paris, but was soon after called home to Washington. In 1858 he settled at New York, where he still remains. His favorite subjects are American rural and domestic life, including the negro and other subjects, though of late he has devoted himself almost exclusively to portrait painting.

JOHNSON, OLIVER (1809-1889), an American editor. He served an apprenticeship in the printing office of the Montpelier, Vt., "Watchman," and in 1831 became editor of the "Christian Soldier;" from 1865 to 1870 he managed the "Independent," and then accepted the editorship of the New York "Tribune," which post he resigned two years later, in order to take charge of the "Christian Union." He was active in the cause of anti-slavery, and was an organizer of the New England anti-slavery society in 1832.

JOHNSON, REVERDY (1796-1876), an American statesman. He was admitted to the bar in 1815, and began practice in Prince George's county, Md. In 1817 he removed to Baltimore, and in 1821 became a member of the State senate. He was appointed attorney-general in President Taylor's cabinet, and from 1845 to 1849 was in the United

States Senate. In 1868 he went to England as minister, and while there negotiated the "Johnson-Clarendon" treaty for the settlement of the Alabama claims, besides settling several other important controversies. On his return to the United States in 1869 he resumed the practice of law, which he continued to within a few days of his death.

JOHNSON, RICHARD MENTOR (1781-1850), a vice-president of the United States. He was admitted to the Kentucky bar, and from 1804 to 1807 was in Congress as a Republican. He was reelected in 1807, and served, with the exception of a few months, until 1819. At the beginning of the war of 1812 he raised a battalion of three companies, and commanded it in active service for ten months. Shortly afterwards he raised a regiment of one thousand mounted volunteers, and was himself in command until the fall of 1813 when he was wounded several times in the battle of the Thames, and compelled to give up his post. From 1819 to 1829 he was a United States Senator, and then was again a member of the House till 1837, when he was chosen vice-president on the ticket with Martin Van Buren. He was afterward sent to the legislature, and was a member of that body at the time of his death.

JOHNSON, ROSSITER, an American author, is the son of Reuben Johnson, who gained celebrity from being one of a small company who repelled the British fleet which bombarded Stonington, Conn., in 1814. Rossiter Johnson was born in Rochester, N. Y., January 27, 1840; was graduated at the University of Rochester in 1863. From 1864 until 1868 he was co-editor of the Rochester "Democrat," a Republican newspaper, and from 1869 until 1872 edited the Concord (N. H.) "Statesman." From 1873 until 1877 he was one of the editors of the *American Cyclopædia*, and in 1879-80 assisted Mr. Sidney H. Gay in preparing the last two volumes of the so-called *Bryant's History of the United States*. In 1883 he became editor of the *Annual Cyclopædia*, and has so continued for the last ten years. He planned and edited the series of *Little Classics* (18 volumes, Boston, 1874-75 and 1880).

JOHNSON, SIR JOHN (1742-1830), Baronet, son of Sir William Johnson, born near Albany, N. Y., and during a visit to England in his youth knighted by George III., as a compliment to his father. He was made a major-general of militia in 1774, and when American independence was declared he went to Canada, and returning at the head of troops raised there by himself took an active part in aid of the British in central New York. After the war he resided in Canada, where he was given large tracts of land by the British government.

JOHNSON, SIR WILLIAM, Baronet (1715-1774), a British soldier. He emigrated to America in 1738, and established himself on a tract of land on the south side of the Mohawk, a few miles west of Schenectady. He became a trusted friend of the Indians, and was appointed superintendent of Indian affairs in 1743. In 1750 he was appointed by the king a member of the governor's council, and in 1755 was created a baronet of Great Britain. During the French war he distinguished himself at Crown Point, Ticonderoga, and other places, and concluded several treaties with the Indians, among them the great treaty of Fort Stanwix in 1768. His extensive correspondence with the British and colonial governments is extremely valuable for a correct understanding of the early history of New York and of America in general.

JOHNSON, WILLIAM SAMUEL (1727-1819), an American jurist. He was admitted to the bar in 1746; and in 1761 and again in 1765 represented

Stratford, Conn., in the general assembly. In the latter year he was chosen a member of the first Colonial Congress that met to consider the stamp act, and in 1766 was sent to the upper house, or governor's council. In 1772 he became a judge of the superior court, but held office only a few months. From 1784 to 1787 he was a member of the Continental Congress, and in 1789 became the first United States Senator from Connecticut. From 1787 to 1800 he was president of Columbia College.

JOHNSTON, ALEXANDER KEITH, LL.D., F.R.S.E., cartographer and geographical publisher, was born near Edinburgh, December 28, 1804. His first important work, the *National Atlas* (fol.), occupied him for five years, and was published in 1843. Its merits received immediate recognition, and Johnston was appointed Geographer Royal for Scotland. Acting on a suggestion from Humboldt, he visited Germany, and gathered material for his *Physical Atlas* (1848; 2d ed., 1856). Its publication was the signal for a shower of honors from the geographical societies of Europe. In 1850 appeared a very useful *Dictionary of Geography*, better known as "Johnston's Gazetteer." In 1851 he constructed the first physical globe, showing the geology, hydrography, etc., of the earth. His *Royal Atlas of Geography* (1861) was one of the most beautiful and minutely accurate atlases ever executed up to that time. Johnston also published atlases of astronomy and geology; a *Military Atlas* for Alison's *History of Europe*; besides educational atlases, physical, general, and classical, which obtained a wide circulation. He died July 10, 1871.

JOHNSTON, ALEXANDER KEITH, son of the foregoing, born in 1846, was educated in Edinburgh, trained as a draughtsman in his father's firm, and afterwards extended his experience in London and Germany. He took part in an exploring expedition to Paraguay in 1874, and in 1879 was appointed leader of the Royal Geographical Society's expedition to East Africa, mainly for the purpose of discovering a practical route to the interior. He was scarcely a month on the way when he fell a victim to dysentery at Berobero on the road between Dar-es-Salaam and Lake Nyassa, June 28, 1879. His work was taken up and successfully completed by Mr. Joseph Thomson. Johnston, who was a frequent contributor to the *Geographical Magazine*, produced a *Physical Geography* (1877), edited and extended Hellwald's *Africa* (1879) in Stanford's series, and edited a sheet map of Africa, and Boyce's *Gazetteer* (1879).

JOHNSTON, GEORGE, M.D. Ed., F.R.G.S., M.R.C.S.E., fellow and president of the King and Queen's College of Physicians in Ireland. He was born in Dublin in 1814, and studied at the University of Dublin. He was a fellow of the Royal Geographical Society, and a member of the Royal Dublin Society. He was the author of *Clinical Reports of the Rotunda Lying-in Hospital, Dublin*, during his seven years' mastership, from 1868 to 1875, which contain a most accurate and valuable body of statistics on obstetrical subjects. Doctor Johnston has contributed papers to the Dublin "Journal of Medical Science." He died in 1889.

JOHNSTON; JOSEPH EGGLESTON, was born in Prince Edward county, Va., February 1807. He graduated at the Military Academy at West Point in 1829, and served in various military capacities, chiefly in the topographical engineers, until the outbreak of the civil war, at which time he was made quartermaster general, with the rank of brigadier general. He resigned his commission April 22, 1861, and entered the Confederate service as major general. During the earlier part of the campaign of 1862 he was in command of all the Confederate forces in

Virginia, and was severely wounded at the battle of Fair Oaks, near Richmond, May 31st. In November, having been made lieutenant general, he was assigned to the command of the military department of Tennessee, and in the following spring made an ineffectual effort to relieve Vicksburg on the Mississippi, which was then besieged by General Grant. After the defeat of General Bragg, at Chattanooga, Nov. 25, 1863, Johnston was assigned to the command of all the Confederate forces in the Southwest, with the rank of general. In 1864 he was at the head of the forces which opposed Sherman in his famous "march to the sea." Compelled to fall back from point to point, the authorities at Richmond became dissatisfied, and on July 17, Johnston was ordered by President Davis to turn over his command to General Hood. Near the close of February, 1865, when Sherman had marched into South Carolina, Johnston, at the express urgency of General Lee, was directed to assume the command of the remnant of the army of Tennessee, and of all the forces in South Carolina, Georgia and Florida, to "drive back Sherman." The force which he could concentrate was greatly inferior to that of Sherman, and he was unable seriously to check his march. Having learned that Lee had surrendered the army of Virginia to Grant, Johnston capitulated to Sherman at Durham's Station, N. C. From the close of the war until 1885 he was engaged in agricultural, commercial, and railroad enterprises. In March, 1885, he was appointed commissioner of railroads by President Cleveland, which position he was deprived of in 1889 by President Harrison. He published a narrative of military operations conducted by him during the war between the States. He died March 21, 1891.

JOHNSTON, RICHARD MALCOLM, an American author, was born in Hancock county, Georgia, March 8, 1822. He graduated at Mercer University, Ga., in 1841, and was subsequently admitted to the bar. He filled the chair of literature in the University of Georgia until the outbreak of the civil war. In 1867 he removed to Baltimore county, Maryland, where he has since resided. He has published, in addition to contributions to periodicals, a *Life of Alexander H. Stephens*, 1878; *A History of English Literature*, in conjunction with W. H. Brown, 1879; *Dukesborough Tales*, 1883; *Old Mark Langston*, 1884; *Two Gray Tourists*, 1885; *Mr. Absalom Billingslea*, and *Other Georgia Folk*, 1888; and *Ogeechee Cross-Firings*, 1889.

JOHNSTOWN, (1) the capital of Fulton county, New York, on Cayadutta Creek, 48 miles west-northwest of Albany and 6 miles south of Gloversville by rail. It has some mills and large manufacturing of gloves and mittens. Population (1890), 7,768.

(2) A town of Pennsylvania, 78 miles east by south of Pittsburg by rail, with large iron and steel works, and other industrial establishments. Johnstown was overwhelmed by the bursting of a reservoir, May 31, 1889. Pop. (1890), 21,805. See CONEMAUGH.

JOINVILLE, FRANÇOIS FERDINAND PHILIPPE LOUIS MARIE D'ORLÉANS, PRINCE DE, a French soldier and author, born at Neuilly in 1818, being the third son of King Louis Philippe. In 1836 he became a lieutenant in the French navy, and in 1840 he commanded the frigate which brought the remains of Napoleon I. from St. Helena to France. In 1843 he married the daughter of Dom Pedro I., Emperor of Brazil. Being made rear admiral in 1844 he commanded the fleet which bombarded Tangiers. His father being driven from the throne in 1848, Prince de Joinville relinquished his command

and went to England. Afterward he devoted himself to travel and study; came to America in 1861, and accompanied Gen. McClellan during his command of the Army of the Potomac. Since 1870 he has lived in retirement in France, and has published *L'Angleterre* and *La Campagne du Potomac*.

JOKAI, MAURITS, a Hungarian novelist, born at Komorn, Feb. 19, 1825. He qualified for an advocate, but never practiced, and after 1849 devoted himself exclusively to literary pursuits.

JOLIET, a city and county-seat of Will county, Ill., on Des Plaines River, 37 miles southwest of Chicago, 44 miles east-northeast of Ottawa, and 22 miles south-southwest of Aurora. It contains many handsome stone buildings, several churches, chapels, schools, banks, a Catholic academy, a convent, and a State prison. Joliet has extensive flour-mills, machine-shops, breweries, lime-kilns, brick-yards, foundries, manufactories of boots and shoes, cigar-factories, Bessemer steel-works and rolling mills, carriage-shops, marble-works, and manufactories of builders' hardware, cooperage, farming implements, stoves, sash, doors, and blinds. At this place there are large quarries of excellent Silurian limestone, called Joliet limestone. Population in 1880, 11,657; in 1890, 27,407.

JOLIET, Louis, born in Quebec, September 21, 1645; died in Canada in May, 1700. He was educated at the Jesuit College of Quebec. In 1672 Governor Frontenac and Talon made an effort to trace the course of the Mississippi river, which was then supposed to discharge itself into the Sea of California. Joliet was intrusted with this enterprise, for which he was provided with a canoe and an assistant. At a Jesuit mission the two were joined by Father Marquette and five others, and proceeded as far as Mackinaw, December 8, 1672. Here they derived some information from the Indians, enough to enable them to make a rough outline map of their proposed route. The party then descended the Wisconsin and Illinois rivers, and on June 17, 1673, entered the Mississippi. After visiting several Indian villages on its banks, they became assured that the river emptied its waters into the Gulf of Mexico, and began their return journey. They reached Lake Winnipeg at the end of September, where they spent the winter at the mission of St. Francis Xavier, and in 1674 returned to Quebec. On the way Joliet lost his map and papers by the upsetting of his canoe in the Lachine rapids of the Niagara river. He was thereafter made governor of the colony, and was married. About 1680 he was granted Anticosti Island, where he built a fort, which was destroyed by the British, and his wife taken prisoner. Later Joliet explored Labrador, and on April 30, 1697, was granted the seigniory of Joliet, near Quebec. The honor of the earliest exploration of the Mississippi remains unsettled; Joliet, Marquette, and La Salle each have their advocates.

JONES, ANSON (1798-1858), a president of Texas. He began the practice of medicine in 1820 at Litchfield, Conn., and in 1833 settled in Brazoria county, Texas. During the war between Texas and Mexico he was a surgeon in the Texan army, and in 1837 was chosen to the Texan congress. From 1837 to 1839 he was minister to the United States Government, in 1840 President of the Senate, from 1841 to 1844 Secretary of State, and from 1845 to its annexation to the United States was president of Texas. His last years were devoted to agriculture.

JONES, CHARLES COLCOCK, Jr., an American lawyer and antiquarian. In 1856 he was admitted to the Savannah, Ga., bar, and was mayor in 1860-61. During the civil war he was a lieutenant-colonel in the Confederate army. He has since de-

voted much time to the history of Georgia and the antiquities of southern Indians.

JONES, HUGH BOLTON, an American artist, born in 1848. He studied in Baltimore, Md., and later in Europe, and in 1877 made a sketching tour in Brittany and Spain. Among his pictures are *Tangier*; *Return of the Cows*; *Brittany, October*; *On Herring Run*; *Baltimore*; *Summer on the Blue Ridge*; *The Poplars*; *The Wayside Pool*, and *The Ferry Inn*.

JONES, JAMES KEINBROUGH, a United States Senator, born in 1839. He was a Confederate soldier in the civil war; commenced the practice of law in 1873; and became a member of the Arkansas State Senate the same year. He was chosen to the 47th Congress, and was reelected to the 48th and 49th. He was then elected to the United States senate, and took his seat in 1885. His term expired in 1891, when he was re-elected.

JONES, JOHN PERCIVAL, a United States Senator, born in 1830. In the early part of the California excitement he went to that State, and engaged in farming and mining in one of the inland counties, which he subsequently represented in both houses of the State Assembly. In 1867 he went to Nevada, and since then has been engaged in the development of the mineral resources of that State. In 1873 he was elected as a Republican to the United States Senate, and has been thrice reelected. His term of service will expire in 1897.

JONESBORO', a city and county-seat of Clayton county, Ga., 20 miles south of Atlanta. It has a large cotton trade and manufactures flour and furniture. Pop. (1890), 803.

JONESBORO', a city and county-seat of Union county, Ill., celebrated for the fine fruit grown in the region. It has good building stone, a State insane asylum, mills and factories. Pop. (1890), 1,000.

JONESBOROUGH, the county-seat of Washington county, Tenn., 100 miles northeast of Knoxville. It is the oldest town in the State, was the first capital, contains a female academy, and a normal institute. Pop. (1890), 937.

JONESIA, a genus of trees of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, having a two-leaved calyx, a funnel-shaped corolla, seven stamens, and a scimitar-shaped pod. The leaves are abruptly pinnate. The asoca of Sanskrit poetry (*J. asoca*) is one of the loveliest trees in the east. Its orange and crimson flowers grow in graceful racemes. Indian poetry abounds in its praises.

JONESVILLE, a railroad junction of Hillsdale county, Mich. It has manufactories of carriages, cotton, and woolen goods. Pop. (1890), 1,288.

JONQUIL, the name given to a species of *Narcissus* with rush-like leaves, allied to the daffodil. The common jonquil (*N. Jonquilla*) has from two to six yellow or white flowers at the summit of its scape. The sweet-scented jonquil (*N. odoratus*) is very generally cultivated. Both species are indigenous to the south of Europe. Perfumed waters are made from the flowers.

JORDAN, DAVID STARR, an American naturalist, born in 1851. In 1870 he became instructor in botany at Cornell, in 1875 professor of biology at Butler university, and in 1879 at Indiana university. He has held many appointments as assistant to the United States fish and other commissions. Besides numerous papers on ichthyology, he has written a *Manual of the Vertebrates of the Northern United States* (1876).

JORDAN, MRS. DOROTHEA, DORA BLAND, an Irish actress, born near Waterford about 1762, died at St. Cloud, France, July 3, 1816. She appeared first in Dublin, under the name of Miss Francis, and soon became popular in the rôles of romps and boys. In 1782 she crossed the channel and obtained an en-

gagement from Wilkinson, of the York circuit, with whom she acted for three years. It was during this period that she assumed the name of Mrs. Jordan. She made her début at Drury Lane in "The Country Girl" in 1785, became at once very popular and retained her hold on the public for nearly thirty years. In 1790 commenced her connection with the Duke of Clarence, afterwards William IV., which continued until 1811. Notwithstanding her youthful follies, there is no reason to doubt that she was faithful to him, and in return he was warmly attached to her. There was no satisfactory explanation of the sudden breaking-off of their relations, but it is supposed to have been for political reasons. She played in London and the provinces until 1814, when she retired to France, and though not in actual want, died there friendless and alone. In 1831 King William raised her eldest son to the peerage, as Earl of Münster, and gave the other Fitz-Clarences the rank and precedence of the younger sons and daughters of a marquiss.

JORDAN, THOMAS, an American general, born in 1819. He entered the United States Infantry service in 1840, and served in the war against the Seminole Indians, and later in the war with Mexico. At the outbreak of the civil war he resigned his commission and entered the Confederate army as adjutant-general, becoming brigadier-general shortly afterward. In 1869 he became chief-of-staff to the revolutionary army in Cuba, and the same year succeeded to the chief command, but a little later resigned. He has since devoted himself to literature, and has written *The Campaigns of Lieut.-Gen. Forrest* (1868).

JORDAN, a village in Onondaga county, N. Y., 17 miles west of Syracuse. It has good water-power, and among its manufactures are wheelbarrows, sleds, furnaces, wagons and flour.

JOUFFROY, D'ARBANS, CLAUDE, MARQUIS DE, a French mechanician, born in Franche-Comté about 1751, died at Paris in 1832. In early manhood he served in the army, and while in Provence studied the navigation of sailing vessels. The application of steam to navigation was suggested to him by the sight of a fire engine, and in 1783 he served in the army and while in Provence succeeded in making a small paddle-wheel steamboat sail up the Rhone at Lyons. The vessel was, however, too defective to be available for purposes of actual navigation, and a patent was refused by the French government. Compelled by the revolution to emigrate, he failed, on account of financial ruin, to float a company, till after Fulton had made his successful experiments on the Seine in 1803. In 1816, having obtained a patent, Jouffroy formed a company, and in the same year launched a steamer on the Seine, but he was unable to compete with other enterprises of the same kind.

JOUGS, JUUGS, or JOGGS, the name given in Scotland to a form of pillory which was used also in Holland and probably in other countries.

JOULE, JAMES PRESCOTT, F.R.S., LL.D., one of the most distinguished experimental philosophers, was born December 24, 1818, at Salford. In his youth he had the good fortune to have for instructor in science the celebrated Dalton; and he soon showed, by constructing for himself electrical machines and other philosophical instruments, the bent of his genius. His earliest notable experiments were made with reference to electro-magnetic engines; from which he passed to quantitative determinations regarding heat, and the transformation of various forms of energy. He is justly entitled to be considered as the experimental founder of the modern theory of conservation of energy—the grandest generalization ever made in

physical science. He died October 11, 1889, at Sale, near Manchester. See a long article in *Nature* (October, 1882). Two volumes of his collected papers have been published by the Physical Society of London (1884-87). The name *Joule* has been suggested, and to some extent used, for the unit of work in practical electricity. It is the work done in one second by the *ampere* or unit current flowing through the *ohm* or unit resistance, and is therefore, according to Joule's law, the heat developed in one second in a conductor having that resistance and carrying that current. It is approximately equal to 10,000,000 ergs; so that "Joule's equivalent," defined as the mechanical equivalent of the heat required to raise the temperature of one gramme of water from 0° C. to 1° C., contains in the same approximation 4.16 *joules*. The universities of Dublin and Edinburgh conferred upon him the degree of LL.D. and the university of Oxford gave him the degree of D.C.L. He also received many marks of honor from abroad; and in 1878 a civil-list pension of £200 was conferred upon him.

JOURNALISM. Journalism may be defined as the art of getting up a newspaper, and by the word newspaper, a daily, or, at the outside, a weekly publication of general circulation, is implied. Reviews and magazines, whether dealing with the abstruse problems of political economy and social regeneration, or furnishing an assortment of serial and short stories, poems, and sketches for the passing of an idle hour, have nothing in common with journals proper. So also with the so-called trade papers and those devoted to scientific or other special subjects. They are not in this category any more than a grocer's price-current or a theater programme. A newspaper is and must be first of all a means of conveying news to the public, and journalism is the trade of the men who prepare this news.

From time to time we are favored with essays on "Schools of Journalism," generally the production of gentlemen whose ignorance of actual newspaper work is in direct proportion to their pronounced opinions regarding the necessity of a university for teaching the unteachable. For if it be true that the poet is born and not made, it is true also that the journalist must be born with an innate capacity for his work, if ever he is to make any headway at it. His education can only be acquired in one school, and that the school of experience. Farming, driving a gig, and writing political editorials are accomplishments held to be within the powers of every adult male not an inmate of a lunatic asylum, but writing editorials is not all there is to journalism.

The preparation day by day of a great newspaper requires the services of hundreds of men in many and greatly varied capacities. Its mechanical make-up is a triumph of art, involving the use of intricate machinery and scientific processes; its business department must be as carefully guarded in every detail as the daily work of a bank or a merchant's office. The origin and development of the *NEWSPAPER* will be treated under that head, and for the mechanical processes involved the articles on *PRINTING*, *TYPOGRAPHY*, *STEREOTYPING*, etc., may be consulted.

Journalism is the intelligent application of trained labor to the gathering, selection, and presentation of actual news. The function of a newspaper is neither to amuse nor to instruct the public. It is perfectly true that the press of the day in this era of blanket-sheets publishes an immensity of what is properly magazine reading and an infinity of leaded-brevier advice on every conceivable subject. From the election of a president to that of a pound-

master, the reader is left in no doubt (until he takes up the opposition sheet) as to whom he should give his suffrage. Party politics sways the editorial page—supposed party necessity too often affects the news columns. The high protectionist organ devotes its editorial columns to advocating the blessings of a hundred per cent. ad valorem tax; the straight-out party publication inveighs against the demagogic doctrines of one political organization or the centralizing tendencies of another. This is not journalism any more than the attack of a Protestant church paper on the Pope, or the denunciation of the liquor trade by a prohibition publication, is journalism.

The business of a newspaper is to give the news, and the ideal newspaper would be the one which gave the best and freshest news in the most readable shape, and with due regard to the relative importance of the respective items. There is but one other desideratum of a perfect newspaper, and that is, that it should give all the news. To do this the news journal must also contain advertisements. These are news, the freshest, the most constantly varied, the most interesting news of all. Without newspaper advertisements trade would be impossible, and newspapers would perish from the earth. By their means all can learn where best and cheapest to supply their wants, and by advertisements all can make their wants known. It is the task of the journalist to furnish his readers with a paper which shall combine the double functions of a narrator of the story of the world from day to day, and of an epitome of commercial information. To render his paper an acceptable medium to the public who want to sell or to buy, the journalist must offer the advantage of an extensive circulation. To obtain this circulation he must provide the news-seeking public with the best and fullest information gathered from every corner of the earth. The gathering and publishing of news is an expensive process, but for this the advertising columns furnish the sinews of war. The first-class newspaper attracts the first-class advertisements; the advertisements enable the publisher to create and maintain the first-class newspaper.

Journalism, in its highest development, requires for its successful exponent a business man with a knowledge and a proper appreciation of news. He should be well read, but it is no more necessary that he should be able to write than it is that an art critic should be a professional painter in oils, or a rival of Phidias with the chisel. For forty years the London "Times" was edited by a man who, except in the rarest instances, never wrote a line. The editor of a great newspaper must know much of men if he knows little of books. His function is to plan and to direct, to scan the field of life as a general overlooks the field of battle, and to marshal his forces to the best advantage, leaving to others the execution of his plans. If he is given to fads and fancies and attempts to advocate them through his paper, by so much will he fail of making that paper perfect. System and detail are primal necessities of a newspaper. The managing editor is answerable for the establishment and maintenance of this system, and it is a task to tax the energies of a strong man.

In the preparation of a great metropolitan newspaper each department must work in harmony with all the others. The newspaper starts and finishes in the business office, and no amount of editorial talent will keep a paper long afloat if this department is mismanaged. The work of each day must be begun and completed in the twenty-four hours, and there is no leeway allowable. Assuming the mechanical department to be thoroughly or-

ganized and working as one machine, under the control of the business manager, the editor must take up his end of the chain. In the choice of his writers, to take the editorial or writing department, first he selects a staff of educated men, experienced in politics, in economics, and in general knowledge of men and history. Fine writing is in little demand on a daily newspaper. The work calls for men who can appreciate the significance of facts, who can extract the points of an article or a political movement, and who can state a conclusion tersely and in decent English. Specialists may be desirable for certain subjects, but to be successful from the standpoint of the newspaper they should never be enthusiasts. "Above all, no zeal," is the standing order.

News matter proper comes to a newspaper office in three forms: by the regular telegraph service, which is only indirectly controlled by the newspapers receiving it; by contributions (received nowadays almost entirely by telegraph), from special correspondents of the paper; and by means of the local reporters. The telegraph department requires the services of experts, and especially of men who know what to throw away. Every newspaper experiences every day the undesirable luxury of receiving far more news than it can find space for. Special correspondents, especially those permanently located in country towns and paid by space or per item, have a lamentable weakness for spinning out a few threads of fact into a long yarn. These are the men who preface every record of a suicide with the statement that "the sad affair has cast a pall of gloom over the community." From them come the weird stories about the wrecking of the circus and the mammoth aggregation, and the escape of the deadly tiger to the woods. Aside from this, the telegraph editor lives in an atmosphere of absolute uncertainty as to the moment at which news of some destructive catastrophe or important happening may come in. During the day, the managing editor has received communications from scores of points, and has ordered a greater or less amount of telegrams about various occurrences. A paragraph in an afternoon paper, a rumor at a railroad station or in a hotel lobby, may give him the necessary pointer about a disastrous accident at some lonely spot, miles from a news center. This he may cover by telegraphing to correspondents who may be able to reach the scene, or at least to pick up some details from train-men. Or if the affair is not beyond reach a special man, often taken at a moment's notice from the local staff, starts out. He does not need any instructions; all he has to do is to get there, find out the facts, and then get them in time. If he succeeds, especially if by good luck he succeeds while a competitor fails, he has the consciousness of having performed his duty—if he fails, his explanations are not usually well received.

The special telegrams from Washington, from the seat of the State government while the legislature is in session, and from important cities where regular correspondents are maintained, give less trouble to the telegraph editor than the sporadic contributions of the local correspondent. Anything of importance is usually reported as coming and arrangements made for space. But Congress keeps late hours and takes important votes regardless of telegraph editors, while the flood or the cyclone which may call for a half-page account may not be heard of until midnight and may necessitate the overhauling of a page of matter already in type. An entire remodeling of headlines necessarily accompanies this change, and a second or even third edition may have to be issued for late foreign

news. Laws stricter than those of the Medes and Persians govern the hour of going to press and regulate every detail of the mechanical work.

Next in importance to the telegraphic news, and on special occasions for transcending it, is the local budget. The local department is in the hands of the city editor and his assistants. On important papers there is a day city editor and a night one. There are office men to read copy, prepare headings and keep a schedule. The actual news gathering is done by the ubiquitous reporter. Contrary to the general opinion, this greatly misunderstood individual does not walk about the city at his own sweet will and pick up items by chance. He has a faculty of getting there when anything happens, it is true, but he has no understanding with the powers of evil to enable him to be always on the spot when a fire occurs on the outskirts of the city or a man is murdered at midnight four miles from a newspaper office. Reportorial work is divided up according to the amount of news going. The city editor enters on his assignment-book, days and weeks in advance, all regular meetings of civic bodies, clubs and organizations of which he can obtain knowledge, and deputed reporters to attend them. The court reporters spend the day at the courts, prepare the records and report all cases of importance. Men are detailed specially for trials, for the city council, the county board, and other municipal centers. One man attends to all routine railroad matters, another to the lake or river marine.

The proceedings of the board of trade, the fluctuations of prices, and the thousands of happenings in commercial and financial life, occupy the attention of a commercial editor, a financial editor, and their assistants. One man at least on each paper makes the round of the hotels, and with a perseverance worthy of a better cause, interviews the latest arrival from Puget Sound or New South Wales, the traveling politician, or the visiting statesman. Every large paper has three or four reporters who may be said to have a roving commission in one sense, although actually their work requires the closest attention. Their business is to visit the police stations, making their headquarters at the city hall or central police station, and to note all arrests, fires, and other happenings occurring between their hour of beginning work (on a morning paper say 6 p. m.) and the time their paper goes to press. This is the real school of the reporter. A bright, smart young fellow with a decent high-school education and not afraid of work, beginning as a police reporter on a metropolitan newspaper obtains an experience not to be had anywhere else. The life is a rough one, but it has its charms, and the work is of such a character as to call out all the best qualities of a newspaper man. At midnight a report comes by telephone from an outside station that a stabbing affray has occurred in a saloon and that one or more persons have been arrested. Intimate knowledge of the city and familiarity with the transportation system enable the reporter to decide on the moment how to best reach the spot. If a cab is necessary on account of time, he takes one, and if help is needed, as in case of a large fire, he telephones his office for assistance. Meantime he makes for the scene as quickly as possible and the men sent will find him, take instructions from him and work with him for the best interest of their paper. The glory of the night man is the "scoop." If by his superior acquaintance with the police, or by luck or sagacity he can get some news item—an arrest, for instance, where the criminal is locked up at an outside station—and can get the facts to the exclusion of his competitors, he rejoices beyond measure. The night man gravitates natu-

rally to the chair of the city editor, for he learns what news is, how to get it and how to handle it.

Of other departments of a newspaper the more important not yet mentioned are those of the exchange and news editors. The exchange editor is generally a man of considerable experience, and his work is to select from the stacks of "exchanges" all kinds of matter for use by the various departments. He clips horse and base-ball notes for the sporting-editor; notices of changes of pastorates for the religious column; musical and dramatic gossip, short stories, matters relating to local celebrities, important news items of which only brief mention has been made in the telegraph columns. Everything is game for his scissors. The news editor takes care of news items and in many cases has control of the outside correspondence. Most newspapers make a specialty weekly at least, of sporting in its various forms, the drama, household recipes, insurance and banking trade and financial reviews and real estate. These are handled by one or other of the editors, or often by reporters, each taking a department. There is a musical and a dramatic critic on all papers and on some a religious editor is maintained, while the doings of secret societies and benevolent organizations form a department of some newspapers, and others make a specialty of reporting labor movements.

Although the American newspapers have not yet adopted the French system of the feuilleton, a good many publish once a week a continued story, and all devote a large portion of their Sunday issue to stories, sketches, and occasionally verses. Several papers have attained notoriety in the past by the performances of a "funny man," who, by the means of dialect, archaic spelling, or the revamping of ancient Joe Millerisms, filled a column. The better class of newspapers have, however, abandoned this adventitious aid and relegated the Jack Puddings of journalism to the professedly funny weeklies. The sketches in the Sunday editions, when bearing on local subjects, are contributed by men who work "on space," that is, are paid by the column. These articles are ordered by the editor, and the subjects, if well selected, cover matters of local interest, but not strictly possessing value as news. The short stories, as a rule, are flotsam and jetsam hauled in by the exchange editor and found in magazines. A good many of these also are furnished by syndicates; that is, are supplied to a number of papers at one time and at very low rates. Of late years a mania for illustrations has overcome American newspapers and many of these articles are illustrated. The process of newspaper printing and the quality of paper used do not lend themselves to the making of first-class pictures, and some of the illustrations, notably the alleged portraits, resemble nothing in earth or heaven and would justify a suit for libel.

It will be seen by the foregoing necessarily brief sketch of an American newspaper and its method of construction, that to be a thorough journalist a man must have an all-around knowledge, a versatile talent, good descriptive powers, ability to judge of men and to weigh the importance of events, a clear head in emergencies, quickness of decision, and an absolute imperturbability which nothing can shake. If in addition to all these he possesses the desire to make his paper a living force and to furnish his readers with the best news, the latest news, and nothing but the news, condensed into readable English, he has in him the elements of a true journalist and is the master of a profession

which knows nothing of schools, and which in many respects is one of the most interesting and unique products of modern civilization.

JOWETT, BENJAMIN, an English classical scholar, born at Camberwell in 1817. After being educated at Oxford he became a tutor in 1842 and in the same year he was ordained as a clergyman. He served afterwards as an examiner of classical schools and for the Indian civil service. In 1855 he was appointed Regius professor of Greek, in 1870 master of Balliol College, and in 1886 vice-chancellor of the University. His most important published works are *Commentary on the Epistles of St. Paul to the Thessalonians, Galatians, and Romans; The Dialogues of Plato*, translated into English with analysis and introductions, and his translations of *Thucydides* and *Aristotle*. The degree of Hon. LL.D. was conferred on him by Cambridge in 1890.

JOY, CHARLES ARAD, an American chemist, born in 1823. In 1853 he became professor of chemistry in Union College, remaining there till 1857, when he accepted a similar position in Columbia. He retired in 1877 on account of failing health. For a time he was editor of the "Scientific American," and later of the "Journal of Applied Chemistry." Died 1891.

JUNCTION CITY, the capital of Davis county, Kan., finely situated between Smoky Hill and Republican rivers, at the junction of several railroads. Its manufactures are various and in a thriving condition, comprising, among other items, flour, furniture, etc. Population, in 1890, 4,477.

JUNGLEY GAU (*Bos Sylhetanus*), a species of ox inhabiting Sylhet and other mountainous parts of the northeast of India. It is nearly allied to the common ox, and is easily domesticated.

JUNK, a Chinese vessel, often of large dimensions, which, although clumsy and incapable of much seamanship or speed, has proven seaworthy on voyages extending even to America and Europe. Junk is also a popular term for the salt meat supplied to vessels for long voyages.

JUNKER, WILHELM, an African traveler, born of German parents resident in Moscow in 1840, and studied medicine in Göttingen, Berlin, and Prague. Proceeding to Africa in 1874, in the first instance to Tunis and Egypt, he in 1876-88 carefully explored the Makaraka country. After spending some time in Kabayendi itself, he made Khartoum the center from which he traveled on various excursions. A friend of Gordon and of Stanley, Dr. Junker holds a high place among those who have thrown light on "Darkest Africa." His *Reisen in Africa* was translated by A. H. Keane in 1890.

JUNKIN, GEORGE (1790-1868), an American clergyman and educator. In 1819 he was made pastor of the Associate Reformed church at Milton, Pa., with the majority of whose members in 1822 he entered the Presbyterian church. In 1832 he became president of Lafayette college, which he had assisted in founding. From 1841 to 1844 he was president of Miami University, then again of Lafayette College, and from 1848 to 1861 of Washington College, Lexington, Va., but resigned at the beginning of the war and went to Philadelphia, where he resided until his death.

JUSTE, THEODORE, a Belgian historian, born at Brussels in 1818, died in 1888. After finishing his education the minister of the interior employed him first, and soon afterward he became secretary of the board for public instruction. In 1858 he became custodian of the royal museum of antiquities at Brussels, and in 1870 he was appointed professor of history in the military school.

K

KAHNIS—KAMEHAMEHA

KAHNIS, KARL FRIEDRICK AUGUST, born in Germany, Dec. 22, 1814; was educated at Halle, and was next professor extraordinary at Breslau. He became an active writer on Lutheran theology, and in 1850 was made professor of theology at Leipsic. He died in 1888.

KAIN, JOHN JOSEPH, born in West Virginia, May 31, 1841; studied at St. Mary's College, Baltimore, and was ordained as a Roman Catholic priest in 1866. After holding various pastorates he was, in 1875, consecrated bishop of Wheeling, which position he still holds.

KALAKAUA, DAVID, king of the Sandwich or Hawaiian Islands, was born about 1838. He belonged to one of the highest families in the islands. When King Kamehameha V. died in 1872, there were two candidates for the vacant throne, David Kalakaua and William Lunalilo; the latter was elected by a plebiscite, which was confirmed by the legislature. Lunalilo died within a twelvemonth, and Kalakaua again put forward his claims. A legislature, specially convened for the purpose, elected him in February, 1874; but the validity of this election was contested by Queen Emma, widow of Kamehameha IV., who died in 1863. Queen Emma is the daughter of a native chief by an English woman, and was adopted by Dr. Rooke, an English physician on the islands, and, before her marriage with Kamehameha, was known as Emma Rooke. The dispute threatened to result in a civil war, the adherents of Emma hoping that the British government would refuse to acknowledge Kalakaua, who was presumed to be hostile to European influence in the islands; but in June, 1874, Queen Victoria sent a letter to Kalakaua, congratulating him upon his accession, and his right was then admitted. In November, 1874, he made an extended visit to this country, returning again in 1891 for the benefit of his health. The irregularities of his later years, however, had irreparably impaired his constitution. He died in San Francisco in the early part of 1891.

KALAMAZOO, the capital of Kalamazoo county, Mich., a village, though it ranks as the sixth town in the State. It is surrounded by a rich farming region with which it carries on an active trade. Four lines of railway, intersecting at this point, afford excellent shipping facilities. It is largely engaged in the manufacture of plows, harrows, wind-mills, steel-springs, paper, and sash, doors, and blinds. The town is noted for its beautiful streets and public places, and for its excellent institutions. Kalamazoo is an important educational center. Population, 17,857.

KALB, JOHN, born in Germany, July 29, 1721; died near Camden, S. C., Aug. 19, 1780. His father was a peasant; the "de" prefixed to his name is unauthorized and he was no baron. In 1743 he became lieutenant in the French army, in 1747 rose to the rank of brigadier-general, and later took part in the Seven Years' war. In 1768 he visited the American colonies on behalf of the French government, and made an engagement with Benjamin Franklin and Silas Deane to take command in the Continental army. On June 3, 1777, in company with LaFayette, he arrived in the bay of Georgetown, and was promptly appointed by Congress a

major-general. He was with the army at Valley Forge, and served in New Jersey and Maryland until April, 1780. In Carolina General Kalb was appointed to command the Delaware and Maryland troops, and there united his forces with those of General Gates. At the battle of Camden Kalb commanded the American right, which was surrounded. Dismounted and bareheaded, he had a number of hand-to-hand encounters, and fell pierced by eleven wounds, from which he died three days afterward. A monument was erected to his memory in 1825, by the people of Camden, and on August 16, 1886, a statue was placed in front of the courthouse of Annapolis, Md.

KALISCH, DAVID, a German humorist of Jewish parentage, born at Breslau in 1820, died in Berlin in 1872. As a young man he was in Paris as correspondent of German newspapers. Returning to Germany in 1846 he became a contributor to the *Charivari*, a humorous paper published at Leipzig. But in 1848 he founded the *Kladderadatsch*, a similar paper, published at Berlin. He also published some humorous plays, such as *Hunderttausend Thaler*; *Peschke*; *Berlin, wie es weint und lacht*; *Einer von unsere Leut'*, etc.

KALISCH, MARCUS, a Jewish theologian, born at Treptow, Prussia, in 1828, died in 1885. After being educated both at the Berlin University and the Rabbinical College he became embroiled in the political troubles of 1848 and went to England, where he was secretary to the chief rabbi. Subsequently he wrote *A Historical and Critical Commentary on the Old Testament*; *Exodus*; *Genesis*; *Leviticus*; *The Prophecies of Balaam*; and *The Book of Jonah*. He also published a Hebrew grammar.

KALKASKA, the county-seat of Kalkaska county, Mich., 137 miles north of Grand Rapids. The region produces much lumber while the neighboring streams afford a large supply of brook trout. Pop. (1890), 1,161.

KALM, PETER (1715-1779), a Swedish botanist. From 1748 to 1751 he was investigating the botany and natural history of North America for the Swedish government, and then became professor of natural history at Abo, Sweden. He published, besides other scientific works, *A Voyage to North America* (1753), which was an account of the soils and natural curiosities of this country.

KALNOKY, COUNT GUSTAV SIEGMUND, an Austrian diplomatist, born at Lettowitz, Moravia, in 1832, served for a few years in the army, and in 1850 entered the diplomatic service. From 1860 to 1870 he was councillor of legation at the Austrian embassy in London, and in 1874 went as minister to Copenhagen, whence he was transferred in 1880 as ambassador to St. Petersburg. In the following year he was recalled to assume the important office of the joint Austro-Hungarian minister of foreign affairs, in succession to Baron Baymerle—a post which Count Kalnoky has since filled with much ability, pursuing the peace policy which is the foundation of the Central European Alliance.

KAMEHAMEHA I. (1753-1819), the conqueror and first King of the entire group of the Hawaiian Islands, better known as the Sandwich Islands. With the aid of some European vessels and firearms he subdued one chief and one island after the

other until he became master of the whole group in 1809.

KAMEHAMEHA II., LIHOLIHO (1797-1825), son of the preceding, was born in Hawaii in 1797. He was intemperate and given to pleasure. After succeeding to the throne in 1819 he abolished idolatry, and prepared the way for the missionaries, who came from Boston in 1820 and soon taught the Hawaiian people to read and write, to cipher and sew. The King and Queen visited London in 1824, where both died of the measles in 1825.

KAMEHAMEHA III., KAVIKAUVULI (1814-1854), brother of the preceding, was born in 1814 and came to the throne in 1833. Though educated by the American missionaries, he was wild and dissipated in his youth, but in 1840 he granted his people a written constitution and a code of laws, and made considerable progress in educating and civilizing his subjects. In 1842 and 1843 the independence of the Hawaiian Kingdom was acknowledged by the United States and by the French and English governments. The King died childless at Honolulu in 1854.

KAMEHAMEHA IV., ALEXANDER LIHOLIHO (1834-1863), nephew of the preceding, was born in 1834. He was also educated by the American missionaries. After visiting the United States, England, and France, he succeeded to the throne in 1854. He was handsome, amiable, fond of sports and military parades, but when excited with wine he became passionate and reckless. Through his son he hoped to perpetuate his dynasty; but the child died when 5 years old. This loss grieved the King so badly that his health gave way. He died at Honolulu in 1863.

KAMEHAMEHA V., LOT (1830-1872), elder brother of the preceding. While his brother was King, he was commander-in-chief of the forces and minister of the interior. Although dissipated while young, he reformed when he succeeded to the throne in 1863. Thinking that the constitution was too democratic for the good of the people, he granted the present constitution and took the oath to support it. He was strong-minded, fearless, and firm, yet superstitious; generous and confiding toward some people, yet close, avaricious, and suspicious toward others. He was never married, and left no heir to the throne.

KAMELA, or **KAMILA**, an East Indian dye-stuff consisting of a reddish-brown powder which invests the capsules of the tree *Mallotus Philippinensis* (*Rottlera tinctoria*). It is extensively used for dyeing silk, to which it imparts a deep orange color. It is also used in medicine as a vermifuge.

KÄMPFER, ENGELBERT, a German botanist and traveler, born at Lemgo, in Lippe, Sept. 16, 1651, died Nov. 2, 1716. After studying medicine at Königsberg, he in 1683 accompanied a Swedish embassy to Persia, and during the following ten years traveled in India, Java, Siam, and Japan. He published *Amenitates Exoticæ* (1712), and after his death appeared his *History of Japan and Siam*. Most of his writings exist in manuscript in the British Museum.

KANE, ELISHA KENT, an Arctic explorer, was born in Philadelphia, Pennsylvania, February 3, 1820, graduated in medicine at the University of Pennsylvania in 1842, and entered the navy as a surgeon, in which capacity he visited China, the East Indies, Arabia, Egypt, and western Europe, subsequently the west coast of Africa and Mexico; in this last country he did duty on the coast survey. In May, 1850, he commenced his career of Arctic discovery as surgeon, naturalist, and historian to the first Grinnell expedition. His account of it appeared at New York in 1854, entitled *The United States Grinnell Expedition*. In the spring of

1853 he again set out, this time as commander of an expedition; the results of it are fully detailed in his *Second Grinnell Expedition in Search of Sir John Franklin* (2 vols. Phila. 1856). He died at Havana, where he had gone for his health's sake, on February 16, 1857. See *Life* by W. Elder (Phila. 1858), and the briefer one by M. Jones (Lond. 1890).

KANE, JOHN KINTZING (1795-1858), an American jurist. In 1817 he began the practice of law in Philadelphia, Pa., and in 1823 was sent to the legislature. From 1828 to 1830 he was solicitor of Philadelphia, and in 1832 was appointed a commissioner of the French spoliation claims. In 1845 he was made attorney-general of Pennsylvania, and the following year United States judge for that district. From 1856 to his death he was president of the American Philosophical Society.

KANE, SIR ROBERT, an Irish chemist, born in Dublin in 1810, died Feb. 16, 1890. He was educated for the medical profession, in 1832 was received as a member of the Royal Irish Academy, and in the same year projected the *Dublin Journal of Medical Science*. In 1840 he received the gold medal of the Royal Society of London for his researches into the coloring matter of lichens, and in 1847 the Cunningham gold medal of the Royal Irish Academy for his discoveries in chemistry. From 1834 to 1847 he was professor of natural philosophy to the Royal Dublin Society. In 1846 he originated the Museum of Industry in Ireland, was appointed the first director, and the same year received from the lord-lieutenant the honor of knighthood. He was for a number of years president of the Queen's College, Cork, resigning this position, together with the directorship of the museum, in 1873. In 1876 he was elected president of the Royal Irish Academy. His chief books are *Elements of Chemistry* (1842), and *Industrial Resources of Ireland* (1844).

KANSAS CITY, the county-seat of Jackson county, and the second city in size in the State of Missouri, is one of the most important and thriving cities in the west. The Kansas City railways control one-third of the railroad mileage of the United States; there are more miles of cable railroad in operation than in any other city in the world; the postoffice makes a larger percentage of profit for the government than any other office in the Union. It ranks second among American cities in packing-house and stockyards business, in the number of railroads entering its union depot, and in registered mail business; first in agricultural implement business, and in extent and resources of tributary territory. For a number of years the city's growth was slow. Its real growth commenced with the opening to settlement of the territories of Kansas and Nebraska; so that between 1854 and 1860 its population had increased from 400 to nearly 7,000.

The war of the rebellion had so disastrous an effect upon Kansas City, as well as upon the whole State of Missouri, that in 1865 its population had fallen off to about 3,000 people, and its business was almost nothing. Not a railroad reached its borders until 1866, but immediately after the close of the war the city took on new life. Railroads were projected and built in all directions, the Missouri River was speedily spanned by the first bridge ever built across it. Stockyards, grain elevators, and packing houses, street railroads, water-works and gas-works, mercantile and manufacturing establishments, were constructed, and in 1870 the population, according to the United States census, had reached over 32,000. For several years after this, owing to the panic of 1873, matters of all kinds were dull, but in 1876 everything began to revive, and a term of most marvelous growth and prosperity ensued and continued for more than ten years, so that in

1887 the sales of real estate alone amounted to more than \$90,000,000. Everything else maintained the same ratio of progress. Twenty-one railroads centered at its union depot, more than sixty trains per day crossed the Missouri river on the bridges, the packing of beef and pork had become enormous, the stockyards business extended from Kansas to Texas and New Mexico, the grain trade occupied the attention and capital of more than 100 firms, while the agricultural implement business had become the largest of any city in the United States. Other branches of trade, like dry goods, groceries, hardware, etc., were developed in the same proportion, while the population of the city was commonly estimated at 125,000. The horse-car lines had largely given way to cable lines all over the city, while an elevated rapid transit railroad and electric and cable-lines were connecting the city with its namesake on the other side of the State line.

The packing business still leads all others in Kansas City, amounting in 1889 to 400,000 head of cattle, 201,000 sheep, and 1,715,000 hogs; while the shipments of dressed meats alone amounted to 535,000,000 pounds for the same period.

The stockyards were also largely increased last year, as well as the Stockyards Exchange building, so that not only can 5,000 more cattle and 300 more carloads of hogs be cared for, but the 57 firms dealing in stock can be better accommodated with office room. The receipts of the year were 1,220,767 cattle, 2,072,414 hogs, 371,470 sheep, and 34,523 horses and mules, being nearly 20 per cent. greater than for the previous year.

The area of the city is about 23 square miles, and the population by the United States census of 1890 was 132,416.

The railroads now entering the city number 29, and radiate into nearly every portion of the splendid territory tributary to it; others are coming, as well as other cable lines. A new court-house to cost \$500,000 is being built by the county in the northern portion of the city, and a new city hall will be erected on the public square by the end of another year at an expense of \$300,000.

One of the boasts of Kansas City is its high social status, as shown by its beautiful and costly residences, three magnificent opera houses, lovely parks, elegantly paved streets and boulevards, fine libraries and art galleries; all of which, considering their newness, are highly creditable to the people of so young a city.

KANSAS, STATE OF. For general article on the State of Kansas, see *Britannica*, Vol. XIII, pp. 842-844. In 1893 the area of the State still remained, as reported by the surveys of 1890, at 81,700 square miles. The population of the State, which in 1880 was 996,096, had increased in 1890 to 1,427,096, an increment of 431,000, or 43.27 per cent.

In 1880, 10 cities only in the State had a population of 4,000 or more, with an aggregate population of 84,907. Under the eleventh census, 19 cities have a population of 4,000 or more, with an aggregate population of 223,674. This shows an increase in the number of such places of nine, while an increase in the aggregate population of 138,767, or 163.43 per cent. is shown.

The cereal production of Kansas in the year of 1889 was as follows: wheat, 1,582,635 acres, yield 30,399,871 bushels; corn, 7,814,765 acres, yield 259,574,568 bushels; rye, 199,146 acres, yield 2,917,386 bushels; oats, 1,463,526 acres, yield 44,629,034 bushels; barley, 7,201 acres, yield 165,715 bushels; buckwheat, 6,907 acres, yield 67,115 bushels.

The total assessed valuation of property in the year of 1880 was \$160,891,689; in 1890 it was \$348,459,-

944. The increase of valuation is \$187,568,255. The assessed valuation per capita in 1880 was \$161.52; in 1890, \$244.17. The increase per cent. of assessed valuation is 116.58. The assessed valuation of personal property for the year of 1880 was \$52,459,640; in 1890, \$106,617,146.

The aggregate number of acres in trees, nurseries and plants is 7,243, divided as follows: apple, 2,490; apricot, 10; cherry, 261; peach, 155; pear, 145; plum, 300; quince, 27; nut, 23; deciduous, 1,483; evergreens and shrubs, 487; grapes, 210; strawberry, 425; raspberry, 255; blackberry 573; miscellaneous berries and trees, 380.

In vineyards there are 4,542 acres of bearing vines, with an average yield of two tons per acre of fruit.

In the almshouses of Kansas there is an aggregate of 593 persons, of which 512 are white, 81 colored; 234 female, 359 male.

The number of horses in the State of Kansas, in 1890, was 980,305; mules, 93,932; asses, 2,005.

INDIANS.—There were still living in the State of Kansas, in 1890, 1,437 Indians, divided among the following tribes: Pottawatomie, Kickapoo, Iowa, Sac and Fox, Chippewa, and Munsee. The male population number 792; female, 645 persons.

ARTS AND MANUFACTURES.—There was used in the arts, manufactures and medicine, during the year 1889: Alcohol, 10,492 gallons; cologne spirit, 790; highwines, 1,500; whiskey, 26,092; brandy, 1,905; rum, 88; gin, 1,651. Aggregate number of gallons, 42,518.

CRIME.—The number of prisoners in county jails January 30, 1890, in Kansas was: Aggregate 432; white, 346; colored, 86, of which 415 are males, 17 females.

In the matter of higher education the State is not much behind the older settled commonwealth in its recognition of what it should afford to students. The constitution of the State literally declares:

"The legislature shall encourage the promotion of intellectual, moral, scientific and agricultural improvement by establishing a uniform system of common schools, and schools of higher grade, embracing normal, preparatory, collegiate and university departments."

The exact status of the University of Kansas may perhaps be best epitomized by saying that it is abreast of the highest institutions of the country in the quality of that work, of whatsoever nature, which it is equipped to do and therefore professes to do. As regards the whole range of possible university work, the equipment of the institution is of course deficient. Many branches of learning are yet to be taken up. Other like institutions, such as the universities of California, Nebraska, Missouri, Minnesota, Wisconsin, Ohio and Michigan are strong in many branches where the University of Kansas has not yet even made a beginning, but as the State grows in wealth and culture, much is to be expected from the beneficence of private citizens, who in older communities have so liberally endowed institutions of learning.

SCHOOLS.—There are in Kansas 8,811 school-houses, with an enrollment for the year 1890 of 399,322, a gain in enrollment of 62.24 per cent. The aggregate number of teachers employed was 12,260, divided as follows: Male, 4,852; female, 7,323; colored—male, 38; female, 47. There have been reported over 5,500 pupils in Catholic, near 3,000 in Lutheran, some in Mennonite and a few in German Evangelical parochial schools. There is paid to teachers, annually, \$3,021,066. The valuation of school buildings and other property was \$10,617,151.

Prohibition is a part of the statutory law of Kan-

bas; not only statutory law, but a part of the constitution of the State. A very large class of the people earnestly believe in the efficiency of the law, while a respectable element are not personally in favor of prohibition. Many of those who live in the larger towns and cities believe that the expense, resulting from an honest, faithful effort to enforce the law, exceeds the good results obtained, and is greater than the people should be made to bear. In the rural districts the law seems to be generally enforced, but it is not so well supported by public sentiment in the centers of population. Extraordinary powers have lately (1893) been placed in the hands of the executive for the enforcement of the law in cities of the first class, through the metropolitan police system.

No subject has claimed more legislative attention during the past decade than that relating to State regulation and control of railroads. In nearly, if not all, the States of the Union, some legislation has been enacted giving to some person, commission, or court, power to supervise, regulate or control these great thoroughfares of commerce. This growing sentiment has taken root in Kansas, as well as elsewhere, and in 1888 its fruits were the present commission law. It would be going too far, perhaps, to say that this law has been wholly barren of good results. The people expected vast benefits from it, but have profited little in the correction of abuses.

The statutes of Kansas are in great need of intelligent revision. The shortness of the biennial legislative session has apparently operated to prevent systematic and careful effort in the work of amendment. Amendments hastily and inconsiderately made are often of doubtful utility. Many of the statutes are obscure; many are cumbersome; some are obsolete. Others, while accomplishing the purpose for which they were designed, nevertheless entail useless costs and expenses, and sometimes promote instead of lessening litigation. The civil and criminal procedure laws, the corporation law, the law regulating assessment and taxation, and many others, demand the most careful and critical consideration and amendment. A systematic revision of the entire statutes, reducing them in bulk, simplifying that which is obscure, and reducing, where practicable, expenses of administration in the various branches of State, county and city government, would be of great and lasting benefit to the State, in comparison with which the cost would be trifling.

The people are still confronted with the necessity of remedying certain admitted defects in the present constitution; and if the recent vote upon the proposition for a constitutional convention be regarded as so far final as to render a further submission of it inadvisable, it will become the duty of the two houses to consider what proposed amendments to the constitution should be submitted to the people at this session.

In the latter part of 1892, the conjunction of the political parties known as the "Farmers' Alliance" and the "People's Party," was effected, and resulted in the "Populist" movement. The advent of this new party upon the political field was chiefly signalized by a disgraceful riot in the State capitol between the Populists and the Republicans, which attained at one time such serious proportions that it became necessary to call out the militia of the State.

KAPP, FRIEDRICH (1824-1884), a German author. He practiced law in Hamm, Unna, and Frankfurt-on-the-Main, and from 1850 to 1870 in New York city. In 1867 he was made commissioner of emigration, and in 1871 became a member of the German Diet.

KARR, JEAN BAPTISTE ALPHONSE, a French author, born at Paris in 1808. After being educated at the College Bourbon he became an instructor there. He wrote his personal love-romance under the title *Sous les Tilleuls*, which was succeeded by other romances entitled *Une heure trop tard*, and *Vendredi soir*. In 1839 Karr became chief editor of *Figaro*, and soon after issued *Les Gubpes*, a satirical review, which became very popular; and his fanciful romantic outpouring *Voyage autour de mon Jardin* (1845). For many years he practiced floriculture and horticulture at Nice. His miscellaneous writings have been gathered and a selection from them published in 1877, called *L'Esprit d'Alphonse Karr*. He died in 1890.

KARS, a fortress of Russian Armenia, lies about 110 miles northeast of Erzerum. It is situated on a tableland of upwards of 6,000 feet in elevation; the climate is therefore rather severe. Pop. (1880), since the Turks and Lazes have migrated to Turkey, 8,672, mostly Armenians, who carry on an active transit trade. In 1828 Kars was taken from the Turks by the Russians under Paskevitch. It was brilliantly defended by the Turks under General Williams for six months in 1855. At the beginning of the war of 1877-78 Kars was invested by the Russians, but relieved in July by Mukhtar Pasha; besieged again in the autumn, it was carried by storm on Nov. 18, 1877, by General Lazareff. Kars, long a bulwark of the Ottoman empire in Asia, was one of the Armenian fortresses the cession of which to Russia was agreed to by the Berlin Congress in 1878. It forms now a commanding position from a military point of view on the plateau of Asia Minor, facilitating future aggression toward Erzerum and Turkish Armenia in general. Kars, whose fortifications have been recently augmented, is nearly impregnable. See works on the siege of 1855 by Sandwith (1856) and Laurence Oliphant (1856).

KARSTEN, HERMANN, a German botanist and traveler, born at Stralsund, Prussia, in 1817. He spent the years 1843-47 and again 1848-56 in scientific journeys in Venezuela, Columbia and Ecuador. On his return to Germany he was appointed professor of botany in the University of Berlin, and in 1868 he was called to a similar professorship in Vienna. After his resignation in 1872 he went to Switzerland and gave private lessons there.

KASKASKIA, a post-village of Randolph county, Ill., on the right bank of the Kaskaskia River, about 7 miles from its mouth. It was settled by the French in 1673, and was the first capital of Illinois. It was once a large and important place, but has declined.

KASKASKIA, a river of Illinois, rising in the east center of the State, flowing southwest, and entering the Mississippi at Chester. Its length is nearly three hundred miles.

KATKOFF, MICHAEL NIKIFOROVITCH, a Russian politician and journalist, born at Moscow in 1818, died at Snamensky, Aug. 1, 1887. He studied at the University of Moscow, Königsberg, and Berlin, and for some time filled the chair of philosophy at Moscow. In 1861 he became editor of the "Moscow Gazette," the organ of the university, and eventually made it the most influential journal in Russia. At first an advocate of parliamentary government and reform, Katkoff was converted by the Polish rising of 1863 into a leader of the Pan Slavist movement, and a supporter of reactionary government in Russia. He acquired much influence in the government, and is said to have been mainly instrumental in determining Alexander III. to his conservative and reactionary policy.

KATYDID, a name applied to numerous American insects nearly related to grasshoppers, which

insects they resemble. They are aboreal in habit. The true katydid, abundant in the western and central states, is *Cyrtophyllus concavus*.

KAUFMANN, CONSTANTINE VON, a Russian general of German descent, born near Ivangorod in Russian Poland, May 3, 1818, died May 16, 1882. Entering the army as lieutenant of engineers in 1838, he fought against the Circassians in the Caucasus, and especially distinguished himself at the siege of Kars in 1855. In 1867 he was appointed governor-general of Turkestan, and at once set himself to organize this province, then newly conquered; in 1868 he occupied Samarcand, and in 1873 conducted a successful campaign against Khiva. It was through his energetic policy that Russia became the predominating power in central Asia.

KAUTZ, AUGUST VALENTINE, an American soldier, born in 1828. He entered the 1st regiment of Ohio Volunteers, served through the Mexican war, and then served on frontier duty until the beginning of the civil war, when he became a captain in the United States cavalry. At the conclusion of the war he had attained the rank of lieutenant-colonel through gallant and meritorious conduct in numerous battles. He then commanded on the New Mexican frontier till 1874, when he was promoted colonel and placed in command of the department of Arizona. From 1878 to 1886 he served in California, and then went to Nebraska. He is the author of *The Company Clerk* (1863); *Customs of Service for Non-Commissioned Officers and Soldiers* (1864), and *Customs of Service of Officers* (1866).

KAZIMIRZ, a town of Poland, in the government of Lublin, on the Vistula, thirty miles east-south-east of Radom. Population, 7,000.

KEARNEY, a city, a railroad center, and the county-seat of Buffalo county, Neb., in the Platte River valley. It has good water-power, graded schools, and manufactories.

KEARNEY, LAWRENCE (1789-1868), a United States naval officer. He entered the navy as a midshipman in 1807, and in 1813 had become a lieutenant. During the war of 1812 he was employed in the defense of the coast of South Carolina, and later cleared the West Indies and Gulf coast of pirates. Subsequently he was active in the suppression of opium smuggling. He then held various shore appointments, including the command of the New York station, and the presidency of one of the naval boards of inquiry. In 1867 he was made commodore on the retired list.

KEARNY, PHILIP (1815-1862), a United States soldier. He entered the army in 1837, and in 1839 went to Europe to examine the tactics of the French cavalry service. He entered the cavalry school at Saumur, and then enlisted in the French army, attracting the attention of the government by his daring exploits during the campaign in Algeria. In 1840 he returned to the United States, was made aide to Gen. Alex. Macomb, and then was attached to the staff of Gen. Winfield Scott from 1841 to 1845. In 1846 he was made a captain, and during the assault upon the city of Mexico he lost an arm. In 1859 he returned to France and served with his old comrades at Magenta and Solferino. In 1861 he re-enlisted in the United States army, was promoted major-general, and was killed at Chantilly. Gen. Scott referred to Gen. Kearny as "the bravest man I ever knew, and the most perfect soldier."

KEARNY, STEPHEN WATTS (1794-1848), an American soldier. At the beginning of the war of 1812 he enlisted in the 13th infantry as a lieutenant, and the following year was made a captain. In 1846 he became a brigadier-general, and at the outbreak of the Mexican war took possession of New Mexico.

In 1847 he was governor of California, in 1848 of Vera Cruz, and the same year of the City of Mexico. He wrote *Manual of the Exercise and Manœuvring of U. S. Dragoons* (1837), and *Laws for the Government of the Territory of New Mexico* (1846).

KEELHAULING, a punishment used in the navy during the 17th and 18th centuries. The culprit was suspended from one yard-arm, dropped into the water, and hauled beneath the keel to the other side. Keelhauling was practiced on an Egyptian corvette as recently as August 1882.

KEEN, WILLIAM WILLIAMS, an American physician, born in 1837. From 1862 to 1864 he was a surgeon in the United States army, and then settled in Philadelphia, Pa., where he lectured for nine years in Jefferson Medical College, also conducting the Philadelphia School of Anatomy. In 1884 he was made professor of surgery in the Woman's Medical College of Philadelphia. He is the author of *Gunshot Wounds and Other Injuries of Nerves* (1864); *Reflex Paralysis* (1864); *Clinical Charts of the Human Body* (1872); *Complications and Sequels of Continued Fevers* (1876); and *Early History of Practical Anatomy* (1875).

KEENE, a city of New Hampshire, the county-seat of Cheshire county, on the Ashuelot River, 50 miles west-southwest of Concord. It is at the junction of several railroads. Keene is a beautiful, well-built city, with wide, shaded streets. It is the seat of varied and extensive manufactures. Among the goods produced are furniture, leather, pottery, bricks, woolen goods, carriages, etc. There are also extensive granite quarries. The city has a fine central square from which radiate the five principal streets, and in which is a handsome monument to the memory of soldiers who fell in the civil war. An abundant water supply is derived from a lake three miles distant. Keene is the business-center of a fertile agricultural region. Population in 1890, 7,446.

KEESEVILLE, a post-village of Essex and Clinton counties, N. Y., lying on both sides of the Au Sable River, four miles west of Lake Champlain. In 1813 a woolen-factory was erected here and three years later a rolling-mill. The water-power is abundant and the leading industry is the manufacture of iron and steel. Population, 2,548.

KEIGHTLEY, THOMAS, a British author, born at Dublin, Ireland, Oct. 1789, died at Erith, Kent, England, Nov. 4, 1872. He was educated at Trinity College, Dublin, and in 1824 settled in England to a life of letters. His histories of Rome, Greece, and England long held their place as school manuals. Other works are *Fairy Mythology* (1850); *Life, Writings, and Opinions of Milton* (1855); and *Shakespeare Expositor*.

KEIL, KARL AUGUST GOTTIEB, a German theologian, born at Grossenhain, Saxony, in 1754, died in 1818. After being educated at the University of Leipzig he became professor of philosophy there in 1785, and two years later he was transferred to the chair of theology which he held until he died. He was noted for special proficiency in explaining the Scriptures, giving closest attention to the grammatical and historical elements of the text. His principles in this direction are set forth in his *Hermeneutik des Neuen Testaments* (1810).

KEITH, ALEXANDER, a Scotch author and clergyman, born at Keith Hall, Aberdeenshire in 1791, died at Buxton, England, in 1880. After graduating at Aberdeen he was for a short time minister at St. Cyrus in Kincardineshire. His *Evidence of the Truth of the Christian Religion derived from the Literal Fulfillment of Prophecy* proved very popular. In 1839 Keith was sent by the Church of Scotland to inquire into the state of the Jews in Palestine.

and Eastern Europe. He published his observations in 1843 in *The Land of Israel* and some later works. When the Church of Scotland was divided in 1843, he joined the Free Church. Keith was very active in the work of converting the Jews to Christianity.

KEITH, GEORGE (1645-1715), an English clergyman. In 1664 he became a Quaker, and in 1684 emigrated to America. In 1689 he took charge of a Friends' school in Philadelphia, but left it soon afterward to travel in New England. He then formed a society of his own, known as the Christian or Baptist Quakers, or Keithians; but, again becoming dissatisfied, he was ordained in the Church of England. In 1702 he was sent on a mission to New Jersey and Pennsylvania, and seven hundred Quakers received baptism in the Episcopal church under his influence. Subsequently he became rector of Edburton, Sussex, England. He wrote *Journal of Travels from New Hampshire to Cayatuck* (1706); *Standard of the Quakers* (1702); and *New Theory of Longitude* (1709).

KEITH, GEORGE KEITH-ELPHINSTONE, Viscount, a British admiral, born near Stirling, Scotland, Jan. 7, 1746, died March 10, 1823. Entering the navy in boyhood, he saw service in various parts of the world, and distinguished himself in numerous engagements in the American war and the French wars. He was in command of the expedition in 1795-'97 which took possession of Cape Colony in South Africa, Ceylon, Cochin, Malacca, and the Molucca Islands, and for these distinguished services was made Baron Keith. He also cooperated with Abercromby in the Egyptian expedition, and was made Viscount in 1814.

KELLEY, WILLIAM DARRAH (1814-1890), an American Congressman. In 1841 he was admitted to the Pennsylvania bar, in 1845-'46 he was attorney-general of the State, and from 1846 to 1856 was judge of the Philadelphia court of common pleas. In 1860 he was elected to Congress as a Republican and retained the position until his death. He wrote *Address at the Colored Department of the House of Refuge* (1850); *Reasons for Abandoning the Theory of Free Trade and Adopting the Principle of Protection to American Industry* (1872); *Speeches, Addresses* (1872); *Letters on Industrial and Financial Questions* (1872); *Letters from Europe* (1880); and *The New South* (1887).

KELLOGG, CLARA LOUISE, an American singer, born in 1842. She acquired her musical education in New York city, and in 1861 made her first public appearance as Gilda in *Rigoletto*. Her success was almost immediate, and after singing in her own country, she went, in 1867, to London where she made her *début* as Marguerite, winning instant popularity. The following year she returned to America, and after singing for a while in the United States, appeared in many European countries, always carrying her audience to the highest pitch of enthusiasm. Her voice is a pure soprano of a wide range, and is tuneful to the highest point of perfection. Among the operas with which her name is most identified are *Faust*, *Crispino*, *Traviata*, *Aida*, and *Carmen*. In 1887 Miss Kellogg became the wife of Mr. Paul Strakosch.

KEMBLE, FRANCIS ANNE, an Anglo-American actress and Shakespearean reader, born in 1809. In 1829 she made her *début* at Covent Garden, London, and in 1832 came to the United States with her father, Charles Kemble, where she met with great success. In 1834 she married Pierce Butler, of Philadelphia, and retired from the stage; but the marriage being unhappy, they obtained a divorce, and Mrs. Butler went to live in Lennox, Mass. In 1849 she came before the public at Philadelphia in her

first course of Shakespearean readings, and these entertainments were afterwards repeated in many cities of America and Europe. "Fanny" Kemble has also written considerably, among her works being *Francis the First*, a drama (1832); *Journal* (1835); *The Star of Seville*, a drama (1837); *Poems* (1844); *A Year of Consolation* (1847); *Plays* (1863); *Journal of a Residence on a Georgia Plantation* (1863); *Records of a Girlhood* (1878); *Records of Later Life* (1882); and *Notes on Some of Shakespeare's Plays* (1882).

KEMPEN, a town of Rhenish Prussia, seven miles northwest of Krefeld. It manufactures silk goods, wax candles, vinegar, etc. Population, 5,952. Also a town in the Prussian government of Posen, forty-eight miles northeast of Breslau. Population, 5,787.

KENDAL, MRS. MARGARET BRUNTON, actress, long known to the public as "Madge" Robertson, and more recently as the wife of Mr. William Hunter Kendal (veré Grimston), the actor; was born at Great Grimsby, Lincolnshire, March 15, 1849. Her grandfather, her father, and her uncle were all actors. Her brother was the dramatist, T. W. Robertson. Miss Robertson's *début* in London was made on July 29, 1865, when she appeared at the Haymarket as "Ophelia" to the "Hamlet" of Walter Montgomery, and in the following month she played, at the same theater, "Desdemona" to the "Othello" of Ira Aldridge. In 1867 Miss Robertson returned to town, appearing at Drury Lane on Easter Monday as "Edith" in Andrew Halliday's *Great City*. On March 14, 1868, she made her first decided hit in the metropolis, as "Blanche Dumont," in Dr. Westland Marston's *Hero of Romance*. August 7, 1869, Miss Robertson was married to Mr. William Hunter Grimston, who on the stage is known by his assumed name of Kendal. In the ensuing five years she appeared at the Haymarket as "Galatea" in *Pygmalion and Galatea*, as "Selene" in *The Wicked World*, and as "Mrs. Van Brugh" in *Charity*. The creation of the character of "Lilian" gave Mrs. Kendal a position among the leading *comédiennes* of the day. In January, 1875, she began a short engagement at the Opéra Comique. Afterward she joined the Prince of Wales' theater, then under the management of Mr. and Mrs. Bancroft, where her greatest triumph was that which she achieved as "Dora" in the adaptation from M. Sardou called *Diplomacy*. In January, 1879, after a successful tour in the provinces, Mrs. Kendal returned to the Court Theater. In 1881 she joined the company at the St. James' Theater, under the joint management of Mr. Kendal and Mr. Hare. In the spring of 1890 Mr. and Mrs. Kendal played a highly successful engagement in the United States.

KENDALL, AMOS, born in Dunstable, Mass., August 16, 1789; died in Washington, D. C., November 11, 1869. He entered Dartmouth and was graduated in 1811; studied law, removed to Lexington, Ky., and was for a short time tutor in the family of Henry Clay. He then was appointed postmaster of Georgetown, Ky., edited the local paper, and in 1816 became co-editor of the *Argus of Western America*, a democratic newspaper published at Frankfort, Ky. In 1824 he supported the nomination of Gen. Andrew Jackson for the Presidency, and in 1829 was appointed Fourth Auditor of the United States Treasury; in 1835 he was appointed Postmaster-General. President Van Buren retained him in office, from which he retired in 1840. In 1841 and 1842 he established two newspapers, and in 1845 he was connected with Professor Morse in the ownership of patents, by which he became wealthy. He was the originator of the Washington deaf and dumb asylum.

KENDRICK, ASAHEL CLARK, born in Vermont, December 7, 1809; graduated and taught at Hamilton, and in 1854 became professor of Greek in the University of Rochester. He acted as a member of the committee on the revision of the New Testament, and is the author of several educational works and volumes of selections.

KENNAN, GEORGE, born in Norwalk, Ohio, February 16, 1845; he became a telegraph operator, and located a route for the Russo-American telegraph line between Behring Strait and the Sea of Okhotsk. In 1885-'86 he made a tour through Siberia, for the purpose of investigating the Russian convict prisons, the horrors of which he has graphically described in a series of magazine articles.

KENNEDY, ALEXANDER WILLIAM MAXWELL CLARK, was born at Rochester, England, September 26, 1851. He was educated at Eton, where, at the age of sixteen, he published *The Birds of Berkshire and Buckinghamshire; a Contribution to the Ornithology of the Two Counties*, 1868, by an "Eton Boy." He entered the Coldstream Guards in 1870, became captain in 1874, and retired the same year. He is the author of various poems and verses, and of a work of travels, *To the Arctic Regions and Back in Six Weeks*, 1878.

KENNEDY, BENJAMIN HILL, D.D., born at Summer Hill, near Birmingham, November 6, 1804. He graduated B.A. as senior classic and senior chancellor's medalist in 1827, was elected fellow and classical lecturer of St. John's College in 1828; became an assistant master at Harrow, under Doctor Longley, in 1830, and was appointed head master of Shrewsbury School, vacant by the promotion of Dr. Butler to the see of Litchfield, in 1836. Doctor Kennedy has contributed largely to the *Sabrina Corolla* (1850, 3d ed., 1866); and has published *The Psalter in English Verse* (1860, 2d ed., 1877); *The Public School Latin Grammar* (1871, 6th ed., 1882); *The Birds of Aristophanes, Translated Into English Verse* (1874); a school edition of *Virgil* (1876, 3d ed., 1881). He died in 1889.

KENNEDY, JOHN PENDLETON, author, born in Baltimore, Md., October 25, 1795; died in Newport, R. I., August 18, 1870. He was graduated at Baltimore College in 1812, and in 1814 took part in the defense of Bladensburg; studied law and was admitted to practice in 1814. In 1820 he was chosen a member of the State legislature, where he served three years. In 1838 he was elected to Congress as a Whig; and in 1840 served as one of the Presidential electors on the Harrison ticket. In 1852 Mr. Kennedy was appointed Secretary of the Navy, and, as such, zealously pushed forward Commodore Perry's Japan expedition and Dr. Kane's second polar voyage. At the expiration of his term of office he retired permanently from politics. During the Civil war he supported the National cause.

KENNION, GEORGE WYNHAM, D.D., bishop of Adelaide, born about 1846; was educated at Oriel College, Oxford (B. A. 1867, M. A. 1871). He was ordained deacon in 1869, and priest in the following year. On November 30, 1882, he was consecrated, in Westminster Abbey, Bishop of Adelaide, in succession to Dr. Short, who had resigned the see, which comprises the whole of South Australia.

KENRICK, PETER RICHARD, D.D., Roman Catholic archbishop of St. Louis, Mo., was born in Dublin in 1806. He was educated at Maynooth, and ordained a priest in Ireland, but soon afterward came to Philadelphia, where his brother (the late archbishop of Baltimore) was then coadjutor to the bishop. Here he edited the "Catholic Herald" for several years, and published various works, original and translated. He was also made vicar-general of the diocese. In 1841 Bishop Rosati, of St.

Louis, requested his nomination as his coadjutor with the right of succession. He was consecrated bishop of Drasa *in partibus*, and coadjutor of St. Louis, Nov. 30, 1841. In 1843, on the death of Bishop Rosati, Doctor Kenrick became bishop of St. Louis, and in 1847 the first archbishop of that city. He has been very successful in promoting the interests of the see, having established a large hospital, an orphanage, two magnificent convents, numerous schools and charitable institutions, and one of the most extensive and beautiful cemeteries in the United States.

KENSETT, JOHN FREDERICK, painter, born in Cheshire, Conn., March 22, 1816; died in New York city, Dec. 16, 1872. In 1840 he went to England, where he became employed as an engraver, and devoted much of his time in studying the art of design. In 1845 he exhibited at the Royal Academy of London his earliest painting, *Windsor Castle*. He went to Rome, where he spent two years, and completed a number of Italian landscapes. His *View on the Arno* and *Shrine*, exhibited at the National Academy in New York city in 1848, established his reputation as an artist. In 1848 he returned to New York city, where he became permanently located. In 1849 he was made an academician, and in 1859 was appointed a member of the commission to superintend the decoration of the Capitol at Washington.

KENT, WILLIAM CHARLES MARK (known as Charles Kent), was born in London, Nov. 3, 1823. From an early age he adopted literature as a profession, and has produced a number of volumes of poems, essays, and stories. He was for twenty-five years editor of the "Sun" newspaper, and for seven years (1874-'81) editor of the Roman Catholic publication, the "Weekly Register." He has edited the works of Lamb, Burns, and Moore, and the late Lord Lytton, and has published a number of articles, essays, pamphlets, etc., under various assumed names, besides some theological works of which *Corona Catholica* is the best known.

KENT, formerly FRANKLIN MILLS, a railroad junction of Portage county, Ohio, on the Cuyahoga river, thirty-one miles southeast of Cleveland. It has machine and car-shops, cotton and flour mills, and fine window glass is made from white sand rock found in the vicinity.

KENT ISLAND, the largest island in Chesapeake Bay, belonging to Queen Anne county, Md. It was colonized in 1631 by Claiborne, who here established the first settlement in the State. The island is 15 miles long, and has a very fertile soil and important oyster fisheries. It contains the village of Stevensville.

KENTISH RAG, the local name given to a grayish blue limestone which occurs at Hythe, and other places on the coast of Kent in the lower greens and measures. It is sometimes sixty to eighty feet thick.

KENTLAND, a post-village, county-seat of Newton county, Ind., situated on Grand Prairie, four miles east of the western boundary of the State.

KENTON, a post-village, county-seat and railroad junction of Hardin county, O., situated in the center of the State, in a farming district, on the headwaters of the Scioto River. Lumbering and manufacturing are the industries. Population 5,648.

KENTON, SIMON (1755-1836), an American pioneer. At the age of sixteen he had an affray arising from a love affair, and believing that he had killed his adversary he fled from Virginia to Kentucky where he ranged the country as a spy against the Indians till 1778. He was then captured by the Indians, but escaped some months afterward, and during the invasion of Kentucky by the British and

Indians Kenton led a company and aided in driving out the invaders. In 1782 he again commanded a company, and then, learning that the man he supposed he had killed was still living, he visited his old home, but soon afterwards reentered the army. In 1793 he was major of a battalion of Kentucky volunteers, in 1805 became a brigadier-general of Ohio militia, and fought at the battle of the Thames in 1813. In all his undertakings Kenton displayed remarkable courage, sagacity, and endurance, and Kenton county, Ky., was named in his honor.

KENTUCKY RIVER, a river of Kentucky, formed by two forks which rise in the Cumberland Mountains, and, after a winding northwest course of about two hundred and fifty miles, entering the Ohio about twelve miles above Madison, Indiana. The river runs through part of its course between perpendicular limestone walls, and is navigable for steamships beyond Frankfort.

KENTUCKY, STATE OF. For general article on the State of KENTUCKY, see Britannica, Vol. XIV, pp. 41-44. The census of 1890 reported the area 40,000 square miles; population, 1,118,587. Capital, Frankfort, with a population (1890) of 8,250.

The populations of other chief cities and towns in 1890 were as follows: Louisville, 161,005; Covington, 37,375; Lexington, 22,355; Newport, 24,938; Paducah, 13,024; Owensborough, 9,818; Henderson, 8,830; Bowling Green, 7,790; Hopkinsville, 6,457; Paris, 5,505; Maysville, 5,350; Richmond, 4,737; Danville, 3,765; Harrodsburg, 3,194; Mt. Sterling, 3,627; Shelbyville, 2,676; Elizabethtown, 2,259; Lebanon, 2,805.

The population and area of the State by counties are shown in the following table:

Counties.	Area.	Population.	
		1890.	1880.
Adair.....	400	13,721	13,078
Allen.....	835	13,692	12,089
Anderson.....	200	10,510	9,361
Ballard.....	250	8,390	14,378
Barren.....	445	21,490	22,321
Bath.....	270	12,813	11,982
Bell.....	350	10,312	6,055
Boone.....	270	12,246	11,996
Bourbon.....	244	16,976	15,956
Boyd.....	180	14,033	12,165
Boyle.....	180	12,948	11,930
Bracken.....	200	12,369	13,509
Breathitt.....	450	8,705	7,742
Breckinridge.....	520	18,976	17,486
Bullitt.....	272	8,291	8,521
Butler.....	452	13,956	12,181
Caldwell.....	315	13,186	11,282
Calloway.....	434	14,075	13,295
Campbell.....	140	44,208	37,440
Carlisle.....	190	7,612	
Carroll.....	165	9,296	8,953
Carter.....	544	17,304	12,345
Cassidy.....	444	11,513	10,883
Casey.....	708	34,118	31,682
Christian.....	260	15,494	12,115
Clark.....	580	12,447	10,222
Clay.....	220	7,047	7,212
Clinton.....	340	13,119	11,688
Crittenden.....	345	8,452	8,894
Cumberland.....	410	33,120	27,730
Dayless.....			
Edmonson.....	348	8,005	7,222
Elliott.....	270	9,214	6,567
Estill.....	250	10,896	9,860
Fayette.....	252	35,698	29,023
Fleming.....	340	16,078	15,221

Counties.	Area.	Population.	
		1890.	1880.
Floyd.....	410	11,255	10,176
Franklin.....	300	21,327	15,639
Fulton.....	190	10,005	7,977
Gallatin.....	130	4,611	4,832
Garrard.....	225	11,138	11,704
Grant.....	280	12,671	13,088
Graves.....	550	28,534	24,138
Grayson.....	670	15,688	15,784
Green.....	275	11,468	11,871
Greene.....	352	11,911	13,371
Hancock.....	200	9,214	8,563
Hardin.....	580	21,304	22,564
Harrison.....	410	6,197	5,278
Hart.....	315	16,914	16,404
Hart.....	410	16,439	17,133
Henderson.....	472	29,536	24,515
Henry.....	273	14,164	14,492
Hickman.....	240	11,537	10,651
Hopkins.....	550	23,505	19,122
Jackson.....	305	8,261	6,678
Jefferson.....	375	188,598	146,010
Jessamine.....	162	11,248	10,864
Johnson.....	300	11,027	9,155
Kenton.....	152	54,461	49,983
Knott.....	365	6,438	
Knox.....	350	13,762	10,587
La Rue.....	260	9,433	9,793
Laurel.....	450	13,747	9,131
Lawrence.....	465	17,702	13,262
Lee.....	228	6,205	4,254
Leslie.....	420	3,944	3,740
Letcher.....	310	6,920	6,601
Lewis.....	450	14,803	13,154
Lincoln.....	328	15,962	15,080
Livingston.....	360	9,474	9,165
Letcher.....	544	23,812	24,358
Lyon.....	275	7,628	6,768
McCracken.....	250	21,051	16,262
McLean.....	256	9,887	9,203
Madison.....	385	24,348	22,052
Magoffin.....	300	9,196	6,944
Marion.....	336	15,648	14,693
Marshall.....	330	11,287	9,547
Martin.....	235	4,209	3,057
Mason.....	225	20,773	20,479
Meade.....	332	9,484	10,323
Menifee.....	150	4,466	3,755
Mercer.....	250	15,034	14,142
Metcalf.....	410	9,871	9,423
Mourne.....	272	10,989	10,741
Montgomery.....	200	12,367	10,566
Morgan.....	288	11,249	8,455
Muhlenberg.....	494	17,955	15,098
Nelson.....	380	16,417	16,609
Nicholas.....	190	10,764	11,869
Ohio.....	610	22,946	19,669
Oglethorpe.....	170	6,754	7,667
Owen.....	312	17,676	17,401
Owsley.....	176	5,975	4,942
Pendleton.....	310	16,346	16,702
Perry.....	448	6,331	5,607
Pike.....	180	17,373	15,601
Powell.....	144	4,698	8,639
Pulaski.....	870	25,731	21,813
Robertson.....	210	4,684	5,214
Rockcastle.....	280	9,841	9,670
Rowan.....	320	6,132	4,420
Russell.....	290	18,136	7,521
Scott.....	272	16,546	14,965
Shelby.....	405	16,521	16,813
Simpson.....	320	10,878	10,641
Spencer.....	200	8,760	7,040
Taylor.....	270	9,352	9,359
Todd.....	360	16,514	15,994
Trigg.....	425	13,902	14,489

Counties.	Area.	Population.	
		1890.	1880.
Trimble.....	155	7,140	7,171
Union.....	380	18,229	17,809
Warren.....	530	30,158	27,531
Washington.....	300	13,622	14,419
Wayne.....	590	12,852	12,512
Webster.....	240	17,196	14,246
Whitley.....	580	17,590	12,000
Wolfe.....	190	7,180	5,638
Woodford.....	247	12,380	11,800

Total population of Kentucky by decades—census of 1790, 73,677; 1800, 220,955; 1810, 406,511; 1820; 564,135; 1830, 687,917; 1840, 779,825; 1850, 982,405; 1860, 1,165,684; 1870, 1,321,011; 1880, 1,648,690; 1890, 1,858,635.

Kentucky was organized as a Territory in 1790, and admitted into the Union as a State in 1792. The following is a complete list of the State governors:

Isaac Shelby.....	1792-96	William Owsley.....	1844-48
James Garrard.....	1796-1804	John J. Crittenden.....	1848-50
Christopher Greenup.....	1804-8	John L. Helm.....	1850-51
Charles Scott.....	1808-12	Leazarus W. Powell.....	1851-55
Isaac Shelby.....	1812-16	Charles S. Morehead.....	1855-59
George Madison.....	1816	Beriah H. Magoffin.....	1859-61
Gabriel Slaughter.....	1816-20	James F. Robinson.....	1861-63
John Adair.....	1820-24	Thomas E. Bramlette.....	1863-67
Joseph Desha.....	1824-28	John L. Helm.....	1867
Thomas Metcalfe.....	1828-32	John W. Stevenson.....	1867-72
John Breathitt.....	1832-34	Preston H. Leslie.....	1872-75
James T. Morehead.....	1834-36	James B. McCreary.....	1875-79
James Clark.....	1836-37	Luke P. Blackburn.....	1879-83
Charles A. Wickliffe.....	1839-40	J. Proctor Knott.....	1883-87
Robert P. Letcher.....	1840-44	Simon B. Buckner.....	1887-91

The Census Educational Report of 1890 furnishes the following summaries for the State: Public schools, 8,722, with 7,515 white teachers and 1,207 colored teachers; also 352,955 white scholars, and 54,612 colored scholars. The gain in the population during the decade was 12.73 per cent.; the gain in the public school enrollment was 39.37 per cent. There were reported 7,337 school-houses, of which 2,839 are log. One hundred and eighty-five churches were used as school-houses 136 being used for colored schools. Seven thousand pupils clasped as private were in schools reported as public and private. The parochial schools reported are mostly Catholic.

For numerous other items of interest relating to the State of Kentucky, see the tables embraced in the article UNITED STATES in these Revisions and Additions.

KEOKUK, a thriving city of Iowa, one of the county-seats of Lee county, in the southeastern part of the state. It occupies an elevated situation on the Mississippi River, at the foot of the Lower Rapids. It is a very important railroad center, since nine important railroads either traverse the city or terminate in it. The river is crossed at this point by a fine railroad bridge which connects Keokuk with the towns of Warsaw and Hamilton, Ill. The Mississippi is navigable at this point for the largest steamboats, and the United States government has constructed a ship canal, ten miles long and three-hundred feet wide, around the Des Moines rapids, which extends from Keokuk northward. The city is built on a limestone foundation, and the limestone affords excellent material for building purposes. It has numerous factories and mills, including flour-mills, saw-mills, foundries, etc. The manufactures are various, and the busi-

ness of the town is prospering. Population in 1890, 14,075. See Britannica, Vol. XIV, p. 45.

KEPPEL, SIR HENRY, a British admiral, a younger son of the fourth Earl of Albemarle, born June 14, 1809. He saw service as a captain during the war against China in 1842, and in the campaign against the pirates of the East Indian Archipelago shortly afterwards. During the Crimean war he commanded a vessel in the Baltic and Black seas, and finally the operations of the naval brigade before Sebastopol. In 1857 he took an important part in the destruction of the Chinese fleet in Fat-shan or Fuh-Shan Bay. He was promoted to be vice-admiral in 1867, admiral in 1869, G. C. B. in 1871, and admiral of the fleet in 1877. Sir Henry Keppel has written *Expedition to Borneo, with Rajah Brooke's Journal* (1847), and *Visit to the Indian Archipelago* (1853).

KERKI, a town belonging formerly to Bokhara, Central Asia, about a hundred and twenty miles south of Bokhara City, on the left bank of the Amu-Daria (Oxus). It is a halting place of the caravans trading from Bokhara to Herat, and stands near the chief ferry over the Oxus.

KERMESSE (Flemish *kerkmess*, from *kerk*, church, and *mass*), a religious and parochial festival observed in the Low Countries and in French Flanders, characterized by dances, banquets, target-shooting, and various other forms of amusement, which at one time reached such extravagance that Joseph II., then ruler of Flanders, ordered that all the celebrations should be held on the same day. That rule disappeared with the Austrian domination. The kermess was originally, and is still in many places, held on the feast-day of the patron saint of the place. Recently, in the United States, the term has been applied to a kind of entertainment in which the Flemish costumes and sports are imitated.

KEROSENE, a term applied by Abraham Gesner, in 1846, to oil distilled from coal in Prince Edward Island, and since then generally applied to mineral oil, from whatever source derived, which is suitable for use as illuminating fluid. Most of the kerosene now in use is distilled from petroleum. When of good quality it is nearly colorless, and its specific gravity varies from 0.780 to 0.825. It is the same, or very nearly the same, as the British paraffin-oil.

KERSEY, or KERREYMER, a variety of woolen cloth distinguished by the diagonal ribbed appearance of its upper side, where the nap not being raised allows its structure to be seen. A thin, fine make of Kersey is called cassimere.

KETCH, a broad, strongly-built vessel with two masts, formerly much used for carrying mortars, and called a bomb-ketch.

KEWANEE, a post-village of Henry county, Ill., on the Chicago, Burlington & Quincy Railroad, 132 miles west of Chicago. It has foundries and machine-shops, several wagon and carriage shops, and manufactories of agricultural implements and of steam-heating apparatus. In the vicinity are inexhaustible beds of bituminous coal. Population in 1890, 4,554.

KEY, FRANCIS SCOTT, an American poet, born in Frederick county, Md., in 1780, died at Baltimore in 1843. He studied law in the office of his uncle, and practiced law at Frederick City, Md., until he became district attorney in Washington, D. C. When the British invaded Washington, in 1814, they seized Dr. William Beanes, a planter, as a prisoner, and Key, aided by President Madison, resolved to release him. He went with John S. Skinner, agent for the exchange of prisoners, in a cartel-ship to the British general Ross, who finally

consented to Dr. Beanes's release, but detained the party during the attack on Baltimore. From their ship they could see the flag on Fort McHenry nearly all night by the glare of the battle; but before morning the firing ceased and they watched most anxiously to ascertain which colors floated on the ramparts in the morning. Key's feelings, when he saw that the stars and stripes had not been hauled down, found expression in the *Star Spangled Banner*, which gained for him a lasting reputation. It was to be sung to the tune "Anacreon in Heaven." The verses and tune soon became popular throughout the United States. A collection of Key's poems was published in 1857. James Lick, of California, bequeathed the sum of \$60,000 for a monument to Key. It was erected in Golden Gate Park, San Francisco, in 1887. See *Britannica*, Vol. I, p. 722.

KEY, THOMAS HEWITT, an English philologist, born at Southwark, March 20, 1799, died in November, 1875. He was educated at Trinity College, Cambridge, studied medicine, and was for thirteen years professor of Latin in the University of London. He subsequently became professor of comparative grammar and head-master of the preparatory school, which positions he retained to the time of his death. He published a *Latin Grammar*, *Philological Essays*, and *Language, its Origin and Development*. His chief work is a *Latin-English Lexicon*.

KEYES, ERASMUS DARWIN, an American soldier, born at Brimfield, Mass., in 1810. He graduated at the United States Military Academy in 1832, served in Charleston harbor during the nullification troubles in 1833 and was in 1837-41 aide to Gen. Winfield Scott. After being made captain he served as instructor of artillery and cavalry at West Point from 1844 to 1848, and afterwards he served in the field on the northwestern frontier. During the civil war Keyes fought as brigade-commander in the first battle of Bull Run; commanded the 4th Corps of the Army of the Potomac under Gen. McClellan, and was actively engaged in the Peninsular campaign, which gained for him the promotion to major-general of volunteers. In 1863 he took part in Gen. Dix's expedition against Richmond. He resigned in 1864. In 1884 Gen. Keyes published *Fifty Years' Observation of Men and Events*.

KEYPORT, a post-town of Monmouth county, N. J., on Raritan Bay, twenty-five miles from New York City. Many summer guests visit the place. Here are flour-mills, a fruit-canning factory, and an important enterprise of the town is growing oysters which have been brought from Virginia. Population about 2,700.

KEYSER, a town on the Potomac River, W. Va., and the county-seat of Mineral county.

KEY WEST, a city and port of entry in Florida, the southernmost city of the United States, on a small coral island in the Gulf of Mexico. Among the prominent buildings are a city-hall, county court-house, custom-house, government-barracks, marine-hospital, United States court-house, and Fort Taylor, a casemated pentagonal brick structure, forming the principal fortification of the island. Many of the inhabitants occupy themselves with the business of salvage and wrecking, others with sponge-fishing, while others catch fish and turtles. The most important business, however, is the making of cigars. As the climate of Key West is remarkably equable and free from the extremes of cold and heat, Key West has of recent years become a famous winter resort, especially for consumptive patients. "Key West" is a mispronunciation of the Spanish name of the island, *Cayo Hueso*, meaning Bone Key. The population is cos-

mopolitan, and amounted in 1890 to 18,058. See *Britannica*, Vol. XIV, p. 55.

KHAFALOUN, or KHAPALU, a town of Bulti or Little Tibet, on the Shayook, a short distance above its junction with the Indus, 110 miles north-east of Serinagur, in India. Population, 12,000.

KHANPUR, a town of northwestern Hindustan, in the dominion of Bhawalpur, on a canal which connects it with the Indus. The surrounding country is populous and, where irrigated, fertile. The town is badly built; there is, however, a good bazaar, and a fine mosque. It was formerly of much greater importance than it now is, although it has still a considerable trade. Population, 20,000.

KHAYA, a genus of trees of the natural order *Meliaceæ*. The Kassou-Khaye, a tall and abundant forest tree of Senegal, is much valued for its timber, called African mahogany, which is reddish colored, hard, durable, and of beautiful grain. The bark contains a peculiar alkaloid.

KIDD, WILLIAM, pirate, was a native of Scotland, born, probably, at Greenock, and is supposed to have been the son of a Covenanted minister, who died in 1679. The lad went early to sea, saw much hard service privateering against the French, and gained a high reputation for stubborn courage, and in 1691 a reward of £150 from the council of New York city. At this time the American colonies were supposed to be nests of pirates who infested the Indian Ocean, and Coote, Earl of Bellamont, was sent out by William III as governor of New York and Massachusetts with special instructions to suppress the pest. A ship of 80 guns was fitted out by a private company in London and given to Kidd, who was furnished with the usual letters of marque. In January, 1697, he reached Madagascar, the chief rendezvous of the pirates, but ere long disquieting reports reached England that Captain Kidd was playing the game of pirate himself. After a two years' cruise he returned to the West Indies, and a few months later had the temerity to go to Boston without securing himself by a safe-conduct. In spite of the half promises that had been made him he was arrested and sent to England, where he was tried for piracy and the murder of one of his men. Of the latter charge he was formally found guilty and hanged at Execution Dock, London, May 24, 1701, protesting his innocence to the last.

KIEKIE (*Freyinetia Banksii*), a climbing shrub of the natural order *Pandanaceæ*. It yields an edible fruit said to be the finest indigenous to New Zealand. It is found in the northern part of that country.

KIEPERT, HEINRICH, a German geographer, born at Berlin in 1818. After studying geography as a specialty he explored Asia Minor in 1841-42 and became director of the geographical institute at Weimar in 1845. After 1852 he delivered numerous lectures in Berlin, in 1859 was made professor in the University of that city, and in 1865 was appointed to a position in the statistical bureau there. His most important publications are *Atlas von Hellas*; *Historisch-geographischer Atlas der alten Welt*, which has passed through numerous editions, and *Neuer Hand-Atlas der Erde*.

KILBOURN, or KILBOURN CITY, a post-village of Columbia county, Wis., on Wisconsin River, 108 miles northwest of Milwaukee. It is at the foot of the noted "Dalles of the Wisconsin," and is a pleasant summer resort. It is the center of the hop-trade of the Northwest and it manufactures doors, sash and blinds, flour, and other articles. Population about 1,000.

KILLER, a name applied to the delphinoid, *Orca gladiator*, and other species of that genus, in allu-

sion to their sanguinary and ravenous habits. Killers hunt in companies, and are noted enemies of the right whales as well as of such small species of their own kind as dolphins and porpoises.

KIMBALL, RICHARD BURLEIGH, an American author, born in 1816. He began the practice of law in Waterford, N. Y., and later removed to New York City. He founded the town of Kimball, Texas, and from 1854 to 1860 was president of the railroad running from Galveston to Houston. Among his works are *Letters from England* (1842); *St. Legar, or the Threads of Life* (1850); *Cuba and the Cubans* (1860); *Romance of Student Life Abroad* (1852); *Lectures before the Law Institute of New York City* (1853); *Undercurrents of Wall Street* (1861); *Was He Successful?* (1863); *The Prince of Kashna* (1864); *Henry Powers, Banker, and how He Achieved a Fortune and Married* (1868); *To-day in New York* (1870); and *Stories of Exceptional Life* (1887).

KINBURN, or KILBURN, a former fort of South Russia, situated opposite Otchakoff. Paul Jones first suggested to Suvaroff that it should be fortified. It figured prominently in the Russo-Turkish wars of 1771-74 and 1787, and during the Crimean War it fell before the allies, Oct. 17, 1855. The fortifications were razed in 1860.

KINDERGARTEN (Ger., children's garden; see Britannica, Vol. XIV, p. 79), a place of training for children of both sexes from three to six years of age. Kindergartens have developed rapidly in the United States during the last ten years. The "Fröbel Union" in Boston has devoted itself to the diffusion of Fröbel's principles and methods. "The New Education" appeared in Milwaukee, and was soon united with Miss Peabody's "Kindergarten Messenger," which insists on applying Fröbel's methods of educating the children in the regular schools. Dr. Felix Adler established in New York City a Kindergarten in connection with his "United Charities," where poor children are taken care of and instructed free of charge. His example roused the Californians to start many similar charity Kindergartens. The wealthy Mrs. Quincy Shaw, of Boston, soon caught the enthusiasm. She gave large sums of money for maintaining free Kindergartens through all parts of Boston. Similar schools were maintained and yearly increased in St. Louis, Milwaukee and various other cities.

A new impetus was given to this work by Fröbel's centennial anniversary, celebrated April 21, 1882, in many towns in the United States. On this occasion the souls of many were stirred by appropriate addresses and the sight of small children engaged in song, declamation and suitable games. Soon after, the "Fröbel Institute of North America" was organized at Detroit, Mich. This institute assumed the work of the Fröbel Union. It also showed the applicability of Fröbel's principles to primary schools. In 1884 it united with the National Educational Association, and exhibited at the educational meeting in Madison, Wis., the results and possibilities of Kindergarten-work in all its bearings. This meeting was attended by people from the East, West, North and South. It removed all doubts as to the usefulness and practicability of this work, and kindled an abiding enthusiasm which has spread wherever parents care for the training of their smaller children to self-activity. The numerous free Kindergartens in San Francisco, Chicago, Cincinnati, Philadelphia, Boston, New York and other large cities show how highly Fröbel's principles are now appreciated all over the United States. Large sums of money are now annually expended by private persons in maintaining free Kindergartens in the neighborhood of the poor laboring population. In the Kentucky Insti-

tute for the Blind in Louisville, and in the Perkins Institute for the Blind in Boston the Kindergarten-method of education has also been applied in educating small blind children. A good many unwanted playthings and other working devices had to be procured for this purpose. But the success was beyond the most sanguine expectations, in fact so favorable that subsequently many other schools for the blind have established Kindergartens for their youngest inmates.

Fröbel had insisted that "all education must be founded on religion," that "all our social virtues must be expressions and embodiments of God's Being in ourselves," and that "our true calling is to reveal God as our original type" (*Urbild*). The Kindergarten in the United States lays greatest stress upon this intensely religious foundation of its work, and upon its great effect in developing social virtue in the young. But it lays also proper stress on the mental development, on the technical skill it gives, the preparation it furnishes for the regular school studies, and especially on habituating children to think and act spontaneously. Notwithstanding its great usefulness the Kindergarten is not yet admitted to the public school, although the primary grades, quickened by its spirit, have lately adopted many of its methods, and in the normal schools a Kindergarten department is instructed in the principles and methods of Fröbel.

In other countries the Kindergarten has also made suitable progress. For instance, in many cities of Ontario it has been incorporated with the public schools. It has been given similar recognition in Brazil, Mexico and the Argentine Republic. In many of the Swiss cantons the Kindergartens are integral parts of the public school system. The same is true of Belgium and some parts of Austria. Germany leaves it still to private effort and the philanthropic zeal of its many educational associations. The same is true of England, where private Kindergartens are flourishing. In France there are some 6,000 *Ecoles Maternelles*, or public nurseries and Kindergartens united. They admit children from 2 to 7 years of age. Well-prepared teachers instruct the pupils according to Fröbel's principles and methods.

KINDERHOOK, a village of Columbia county, N. Y., twenty miles southeast of Albany. It has a cotton-mill. The township includes the villages of Niverville and Valatie. Population about 4,000.

KING, CHARLES (1789-1867), an American educator, son of Rufus King. In 1813 he was elected to the New York legislature, and later engaged in the publication of the "New York American." From 1827 to 1845 he was its sole editor, and then became editor of the "Courier and Enquirer." In 1849 he was chosen president of Columbia College, retaining the position till 1863, when he resigned and began a tour in Europe. He died in Frascati, Italy.

KING, RUFUS (1755-1827), an American statesman. In 1781 he was admitted to the Massachusetts bar, and two years later was sent to the Legislature. In 1784, and in 1786 he was a delegate to the old Congress, sitting at Trenton. In 1788 he removed to New York City, and the following year was chosen to the assembly. He was almost immediately elected to the United States Senate, and, while serving a second term, was appointed in 1796 United States minister to England. In 1803 he was relieved at his own request, and remained in private life till 1813, when he was again made a United States Senator. In 1819 he was reelected, and in 1825 accepted the mission to England. After a few months, however, he was obliged,

through failing health, to return to the United States.

KING, SAMUEL ARCHER, an American aeronaut, born in 1828. At the age of twenty-one he constructed a balloon, and in 1851 made his first ascension from Philadelphia. He has since taken nearly 300 voyages, and has traversed the entire country east of the Mississippi, and much that lies west of it. He has often been accompanied by United States signal service men, besides other scientists, and many important observations have been made from his balloon. Mr. King has had many strange and dangerous experiences while navigating the air.

KING, THOMAS STARR (1824-1863), an American clergyman. In 1840 he was made an assistant teacher in the Bunker Hill grammar-school, and in 1842 became principal of the West grammar-school of Medford, Mass. In 1845 he began to preach, and in 1846 was called to a church in Charlestown. In 1848 he became pastor of the Hollis Street Boston Unitarian Church, and held this post for eleven years. In 1860 he accepted a call to San Francisco, Cal., remaining there until his death. Mr. King was the author of *The White Hills; their Legends, Landscape and Poetry* (1859).

KING, WILLIAM RUFUS (1786-1853), a vice-president of the United States. In 1806 he was admitted to the North Carolina bar, and in the same year became a member of the State legislature. He was reelected in 1808, and in 1809 was sent to Congress, where he remained until 1816, when he was made secretary of legation to Naples, holding the position till 1818. He then removed to Dallas county, Ala., and on the adoption of the State constitution became a United States Senator. He served until 1844, when he was appointed minister to France. In 1848 he again became United States Senator, and in 1852 was chosen Vice-President of the United States on the ticket with Franklin Pierce.

KING-FISHER, a bird of which there are two species in America, the Belted *Ceryle alcyon*, and the Green or Texas King-fisher (*Ceryle Americana*). Both nest in holes in the river-banks, and are piscivorous. The Belted King-fisher has a long, straight, and strong bill, short wings, long broad tail, and a crest on the back of the head. Its color is ashy-blue above and white beneath. Length 12x13 inches. This species extends through all North America, being only forced south by the freezing of the water in winter. It is rather unsocial, keeping nearly always alone by the sides of rivers, mill-ponds, or lakes, watching the water into which it seldom plunges in vain. It swallows the fish whole. Its loud, harsh, and rattling cry is particularly annoying at night. In digging a hole for its nest, this bird excavates the ground from 4 to 15 feet in depth, making at the end of the hole a wider space where it deposits its eggs. The Green King-fisher is a much smaller species than the preceding, of a glossy-green color, with a collar around its neck. It is abundant on the coast of the Gulf of Mexico and in the interior of Central America. Its habits are the same as those of the Belted King-fisher. See *Britannica*, Vol. XIV, pp. 81, 82.

KINGLAKE, ALEXANDER WILLIAM, an English historian, born at Wilton House, near Taunton, in 1811, died Jan. 2, 1891. After his education at Eton and Trinity College, Cambridge, was finished, he was called to the bar at Lincoln's Inn in 1837, but retired from the practice of law in 1856. In 1844 he wrote his experiences of eastern travel in a book entitled *Bothen*, which at once secured for him a high literary reputation. Elected to Parliament, he showed on many occasions his bitter feelings

against Napoleon III., especially in his opposition to the Conspiracy Bill. This feeling of hostility was still further manifested in his history of *The Invasion of the Crimea* (1863-1881), a very interesting partisan work.

KINGLET, a dainty little song bird; the ruby-crowned wren. See *Britannica*, Vol. XIV, pp. 82, 83.

KING-POST, the middle or chief post of a roof, standing on the tie-beam, and reaching up to the ridge; it is often formed into an octagonal column with capital and base, and small struts or braces, which are usually slightly curved, spreading from it above the capital to some of the other timbers.

KINGS, FIRST AND SECOND BOOKS OF. See *Britannica*, Vol. XIV, pp. 83-86.

KINGSBOROUGH, EDWARD KING, Viscount, (1795-1837), an Irish statesman and author. From 1820 to 1826 he represented Cork in parliament, and then devoted himself to his great work, *The Antiquities of Mexico, comprising Fac-Similes of Ancient Mexican Paintings and Hieroglyphics, together with the Monuments of New Spain by M. Dupair, with their respective Scales of Measurement, and accompanying Descriptions, the Whole illustrated with many Valuable inedited MSS.* The first of nine volumes was published in 1831, and the eighth and ninth after his death, which occurred in Dublin, Ireland, in a debtors' prison.

KING'S DAUGHTERS, THE ORDER OF THE, a Christian sisterhood of service composed of many small circles of women united in one great organization now (1891) numbering over 150,000 members. It is a Christian but unsectarian order, and its members may be found in all churches and in almost all nations. It originated in New York City, and has spread over nearly every state in the Union, and has its representatives in Canada, England, France, Italy, India, Australia, New Zealand, and other countries. Its members are bound individually and collectively to serve the needy and the suffering, to consider the poor and to be helpful in good work. Each individual circle may choose its own field of labor, but cannot escape the obligation of service.

The badge is a small Maltese cross of silver, often worn with a knot of purple ribbon. The order is an incorporated society, of which this little cross is the seal. Its headquarters are at No. 47 West Twenty-second street, New York City. State secretaries are appointed in twenty-five States and the District of Columbia. Six Provincial secretaries in the various provinces in Canada; Lady Henry Somerset is the honorary secretary for England, and Miss Violet Vida Keane, acting secretary.

Its original circle of nine women, to which have been made some additions, forms now the Central Council of the order. The general officers are members of this Council. The first meeting of this original circle was held in New York City on January 13, 1886. It is now five years old, and it ranks among the strongest and most useful societies of the world. It issues a monthly magazine called *The Silver Cross*, which is most helpful to the members of the order, and takes a high rank among the religious and philanthropic periodicals of the country. It deals with every topic by which women may be made helpful to humanity. Its work in aid of every charitable object is effective and increasing.

OFFICERS OF THE CENTRAL COUNCIL—Office, No. 47 West Twenty-second street, New York City. President, Mrs. F. Bottome; Vice-President, Miss Kate Bond; General Secretary, Mrs. Mary Lowe Dickinson; Treasurer, Miss G. H. Libby; Recording Secre-

tary, Mrs. James F. Ruggles: Corresponding Secretary, Mrs. Isabella Charles Davis.

KINGSLEY, CALVIN (1812-1870), an American Methodist-Episcopal bishop. He taught school for a while, and in 1841 became professor at Alleghany college, Pa. The same year he was admitted on trial to the Erie conference of the Methodist-Episcopal church, was elected a delegate to the general conference in 1852, and in 1864 was chosen bishop. From 1856 to 1864 he was editor of the "Western Christian Advocate." He published a review of *Bush on the Resurrection* (1847); and *Round the World* (1870).

KING'S SILVER, an ancient fine paid to the king, in the Court of Common Pleas in England, on alienation of certain lands.

KINGSTON, a city of New York, the county-seat of Ulster county, on the west bank of the Hudson River, 90 miles north of New York City. The Rondout Creek joins here the Hudson and affords excellent harbor facilities. The city includes the former villages of Kingston, Rondout, and Wilbur. It is on the West Shore & Buffalo Railroad and is the terminus of the Ulster and Delaware and Wal-kill Valley Railroad. It is also near the northeast terminus (Eddyville) of the Delaware and Hudson Canal which connects it with the coal region of Pennsylvania. Large quantities of coal are brought here by this canal and re-shipped on the Hudson. At Kingston many steamboats are owned which are engaged in the river traffic. Kingston is the center of a large ice industry, and does an immense business in making hydraulic cement. It also ships great quantities of bluestone, a metamorphic Devonian sandstone, and an excellent material for flagging. Population in 1890, 21,181. See *Britannica*, Vol. XIV, p. 89.

KINGSTON, a post-borough of Lucerne county, Pa., in the anthracite coal region and on the north branch of the Susquehanna, opposite Wilkesbarre. An imposing monument here erected commemorates the massacre of Wyoming.

KING-WOOD, or **VOLEET WOOD**, a very beautiful wood, in small pieces, used for ornamental work. It is brought from Brazil and is supposed to be the wood of a species of *Dalbergia* (natural order *Leguminosae*, sub-order *Papilionaceae*). The generic name *Jacaranda* is given to several Brazilian trees producing these beautiful woods.

KINIC, or **QUINIC ACID**, an acid existing in the bark of the cinchonas, the leaves of the coffee tree, holly, mate, and many Ericaceae plants.

KINK, a twist or loop in anything, as in a rope, thread, or cord, or in the hair, caused by spontaneous doubling on itself.

KINMUNDY, a city of Marion county, Ill., 229 miles south of Chicago. Brick is here manufactured, and farming and fruit-raising are the chief industries of the neighborhood.

KINNAIRE'S HEAD, a promontory with a lighthouse on the northeast coast of Aberdeenshire, Scotland, near Frazerburgh.

KINNIKINICK, or **KILLIKINICK** (Algonkin, "a mixture"), a name given by the American Indians to the prepared leaves or bark of several plants which they used for smoking, either mixed with tobacco or as a substitute for it. Also, the plants so used, as the bearberry, *Arctostaphylos Uva-ursi*, and the silky cornel, *Cornus sericea*.

KINSTON, the county-seat of Lenoir county, N. C., on the Neuse River. It has manufactories of carriages and plows and is a shipping port for cotton.

KINTYRE, or **CANTYRE**, a peninsula of Argyllshire, Scotland, between the Atlantic and the Firth of Clyde, forty-two miles long, and four and a half to eleven and a half miles broad. At the north end

it connects with the mainland by the isthmus of Tarbert. The surface is diversified by a ridge of low, moorish hills, with many lochs. Coal is found near Campbeltown. A lighthouse, 297 feet above sea-level, stands on the Mull of Kintyre, which is overhung by Ben-na-Lice (1406 feet), and is thirteen miles distant from Ireland. Kintyre contains numerous ruins of ancient architecture.

KIOSK (Turkish) a small open summer-house or ornamental pavilion used in the East and imitated in the parks and gardens of the West. The name is also applied to small shops for the sale of papers in French towns.

KIOWAS, a tribe of North American Indians, formerly living from the Platte River south-westward to the Rio Grande, but now confined to a reservation in the southwest part of the Indian Territory. According to the census of 1890 the Kiowas now number 1,140 souls. For further information see the article **INDIANS, AMERICAN**, in these Revisions and Additions.

KIP, WILLIAM INGRAHAM, an American Protestant-Episcopal clergyman, born in 1811. In 1835 he took orders, and was called to St. Peter's church, Morristown, N. J. He then served as assistant at Grace church, New York City, and in 1838 became rector of St. Paul's at Albany. In 1853 he was made missionary bishop of California, and four years later bishop. He is the author of *The Lenten Fast* (1843); *The Double Witness of the Church* (1844); *The Christmas Holidays in Rome* (1845); *Early Jesuit Missions in America* (1846); *Early Conflicts of Christianity* (1850); *The Catacombs of Rome* (1854); *Unnoticed Things of Scripture* (1868); *The Olden Times in New York* (1872); and *The Church of the Apostles* (1877).

KIPLING, RUDYARD, an English author, who became very popular in 1890. He was born in Bombay in 1865, and from his residence in India has been able to depict Anglo-Indian life—especially the military side of it—with striking fidelity. The publication of *Soldiers Three*, *Plain Tales From the Hills*, and *The Light That Failed* attracted a good deal of attention, and resulted in Mr. Kipling being much sought after by editors of magazines. During 1890 he visited the United States, and published *In Black and White* and other sketches.

KIRATARJUNIYA, the name of one of the celebrated poems of Sanskrit literature. Its author is Bharavi, and its subject is the conflict of Arjuna with the God Siva in his disguise of a *Kirata*, or mountaineer. See *Britannica*, Vol. XXI, p. 284.

KIRCHENTAG, an influential association of ministers and laymen of the Lutheran, German Reformed, United Evangelical, and Moravian churches in Germany, for the promotion of the interests of religion, without reference to denominational differences. It holds an annual meeting, whose place is changed every year. The first meeting took place in 1848.

KIRCHHOFF, GUSTAV ROBERT, a German physicist, born at Königsberg in 1824, died in 1887. After studying mathematics and natural sciences in the University of Königsberg, he lectured in Berlin on mathematical physics in 1848, and in Breslau on experimental physics in 1850. In 1854 he was made professor of natural philosophy at Heidelberg. He made researches on electricity, heat, and the tension of vapors which attracted much attention. But his fame as a physicist is chiefly based on his discovery of "spectrum analysis" which he developed in connection with Bunsen. Among Kirchhoff's publications are *Untersuchungen über das Sonnenspectrum und die Spectren der Chemischen Elemente* (1861); and *Vorlesungen über Analytische Mechanik* (1874).

KIRK, EDWARD NORRIS, (1802-1874), an American Presbyterian clergyman. For a time he traveled in the South as agent of the Board of Foreign Missions, and in 1827 was ordained assistant pastor of the Second Presbyterian church in Albany. In 1828 he became pastor of the Fourth Presbyterian church, and in 1842 accepted a call to the Mount Vernon Congregational church in Boston, remaining there until 1871, when he resigned on account of old age. He published *Memorial of the Rev. John Chester, D. D.* (1829); *Lectures on Christ's Parables* (1856); *Sermons* (1860); and *Canon of the Holy Scriptures* (1862); besides many translations.

KIRK, JOHN FOSTER, LL.D., an American author, born in 1824. From 1847 to 1859 he was secretary to William H. Prescott, the historian, and from 1870 to 1886 edited *Lippincott's Magazine*. In the latter year he was made lecturer on European history at the University of Pennsylvania. He is the author of *History of Charles the Bold* (1868).

KIRKBRIDE, THOMAS STORY (1809-1883), an American physician. In 1832 he was made resident physician of the Friends' asylum for the insane at Frankfort, Pa., and from 1833 to 1835 held a similar position in the Pennsylvania hospital, Philadelphia. From 1840 till his death he was superintendent of the Pennsylvania hospital. He published *Rules and Regulations for the Pennsylvania Hospital for the Insane* (1850); *The Construction, Organization, and General Management of Hospitals for the Insane* (1854); and *Appeal for the Insane* (1854); besides numerous articles in various medical journals.

KIRKDALE CAVE, a cave near Pickering, Yorkshire, England, twenty-eight miles west of Scarborough, discovered in 1821. Its length is 245 feet, and in it there are only two or three places where a man can stand erect. The remains of many animals have been discovered in it. The fossil bones are contained in a deposit of mud on the floor of the cave, covered by stalagmite formed by the water dropping from the roof. See *Britannica*, Vol. V, p. 267.

KIRKHAM, a market town of Lancashire, eight and a half miles north of Preston. It has a grammar school and manufactures cotton, flax, sack-cloth, sacking and cordage. Population (1881), 3,340.

KIRKLAND, CAROLINE MATILDA STANBURY (1801-1864), an American authoress. She married William Kirkland, the author, in 1827, and in 1842 established a girls' boarding-school in New York City. Later she became the editor of the "Union Magazine". Among her works are: *A New Home, Who'll Follow?* (1839); *Forest Life* (1842); *Western Clearings* (1846); *Holidays Abroad* (1849); *The Evening Book, or Sketches of Western Life* (1852); *A Book for the Home Circle* (1853); *The Helping Hand* (1853); *Autumn Hours and Fireside Readings* (1854); *Garden Walks With the Poets* (1854); *Memoirs of Washington* (1857); *School Girl's Garland* (1864); and *The Destiny of Our Country* (1864).

KIRKLAND, SAMUEL (1741-1808), an American clergyman. In 1766 he was ordained to the Congregational ministry, and commissioned Indian Missionary of the missionary society, previously having spent eighteen months among the Six Nations. During the Revolutionary War he was for a time chaplain to the Continental forces at Fort Schuyler and at Stockbridge, Mass. When peace was declared he resumed his labors among the Indians. In 1793 he established Hamilton college for the education of American and Indian youth.

KIRK-SESSION, or CHURCH-SESSION, the lowest court of the Presbyterian churches. It is the governing body of a particular congregation, and is composed of its minister and elders.

KIRKSVILLE, the county-seat and a railroad junction of Adair county, Mo., 6 miles east of Chairton River. The county is well supplied with coal and wood, and has fine farming lands. The village has manufactories of hubs and spokes, woollens, cheese, furniture, and plows. A State Normal School is located here. Population, 3,491.

KIRKWOOD, DANIEL, an American mathematician, born in 1814. In 1843 he was made principal of Lancaster, Pa., high school, and in 1848 of Pottsville Academy. In 1851 he became professor of mathematics in Delaware College, and in 1854 president of that institution. In 1856 he was made professor of mathematics in the Indiana University, and in 1866 of Jefferson College, Pa. In 1867 he returned to Indiana University, where he has since remained. He has published *Meteorite Astronomy* (1867); *Comets and Meteors* (1873); and *The Asteroids or Minor Planets Between Mars and Jupiter* (1887), besides numerous articles for various scientific journals.

KIRWIN, a post-village and a township of Phillips county, Kan., 60 miles west of Jewell City. It is on a branch of the Union Pacific Railroad, and on the north fork of the Solomon River, and contains a United States land office, hotels, and a flour-mill. Population, 824.

KIS-KÖROS ("LITTLE KOROS"), a small town, the birthplace of Petöfi (see *Britannica*, Vol. XII, p. 378). 66 miles south by east from Budapest. It manufactures wine. Population, 6,734. See *NAGY-KOROS*, *Britannica*, Vol. XVII, p. 165.

KIT, a small narrow-bodied violin, about sixteen inches long, capable of being carried in the coat pocket. It was chiefly used by teachers of dancing.

KIT, in military language, the equipment in necessities of a soldier, not including his uniform, arms, or accoutrements. The soldier must replace necessities worn out or lost at his own expense, but he obtains the articles at wholesale, and at very low prices. As these necessities are so cheaply procured, it is held a very heavy military offense to make away with them, and is ordinarily punished with great severity.

KITE, a bird of prey of the hawk kind. Kites are smaller than the average falcons, but are very active, and subsist on insects, mice, reptiles, and other small game. There are four genera of kites.

THE MISSISSIPPI KITE (*Ictinia mississippiensis*) is common in the Gulf States, and in southern Illinois. It is a strong rapid flyer, sailing through the air in graceful circles, much like the turkey-buzzard.

THE WHITE-TAILED or BLACK-SHOULDERED KITE (*Elanus leucurus*) is also common in the southern States, but most abundant in California.

THE SWALLOW-TAILED KITE (*Elanoides forficatus*) is allied to the old world kite (*Milvius*). The Gulf States are its home.

THE SICKLE-BILLED KITE (*Rosthamus sociabilis*), is common in the everglades of Florida, and is therefore known as the everglade kite. See *BRITANNICA*, Vol. XIV, page 103-4.

KITTANNING, the county-seat of Armstrong county, Pa., on Allegheny River. It contains a rolling-mill, oil refineries, woolen-mill, a college and other institutions of learning. Population, 3,095.

KLACZKO, JULIEN, a Polish author, born at Wilna, Lithuania, in 1826. After graduating at the Königsberg University as Ph. D. in 1846, he became one of the writers for the *Revue des Deux Mondes* in Paris. In 1869 Count von Beust, chancellor of Austria, called him to a position in the Aulic council, which he resigned in 1870. His most noted work is *Les Deux Chancelliers*, a bitter attack upon Bismarck and Gortsehakoff. He has also published *La Pologne*

Polonaise au XIX Siècle, and some political works.

KLAPKA, GYORGY, a Hungarian general, born at Temesvar in 1820. In 1832 he entered the imperial life-guards of Austria, and in 1847 he became an officer in one of the frontier regiments. In 1848 he joined the Hungarian revolutionary army, where he distinguished himself so much that he was placed at the head of an army corps in 1849. Under Görgei he contributed to several victories over the Austrian troops, most particularly at Komorn. But finally he had to surrender. In 1866 he raised a Hungarian legion to fight against Austria, but in vain. When Austro-Hungary was reconstructed in 1867 he was permitted to return to his native land, where he was elected a deputy and helped in reorganizing the army. Klapka has published *Memoirs of the War of Independence in Hungary*; *The National War in Hungary and Transylvania*, and *The War in the East* (1855).

KLEIST, HEINRICH VON, a German poet, born at Frankfort-on-the-Oder, in 1776, died in 1811. When a young man he served in the army against Napoleon, and was afterwards employed in the civil service. To see his country degraded under the French tyranny weighed heavily upon his mind and finally drove him to despair. In one of his despairing fits he committed suicide at Wansee, near Potsdam, after shooting his friend, Henrietta Vogel, a highly-gifted woman who shared his infatuation. Kleist was a gifted dramatist, but his works only obtained popularity since his death.

KNAPP, JACOB (1799-1874), an American clergyman. In 1825 he was ordained to the Baptist ministry and settled in Springfield, N. Y. In 1830 he removed to Watertown, N. Y., but two years later began to labor as an evangelist, and travelled through nearly all the States of the union. He preached over 16,000 sermons, led 200 young men to become clergymen, and baptized 4,000 persons. Previous to 1830 he had acquired a considerable amount of wealth by farming and business, which, when he died, he left to his church.

KNAPP, SAMUEL LORENZO (1783-1838), an American author. He was admitted to the bar in 1806, and during the war of 1812 commanded a regiment of militia on the coast defenses. In 1824 he became editor of the "Boston Gazette," and in 1826 of the "National Republic." In 1828 he went to New York and returned to the practice of his profession. He published *Travels in North America by Ali Bey* (1818); *Biographical Sketches of Eminent Lawyers, Statesmen and Men of Letters* (1821); *Memoirs of Gen. Lafayette* (1824); *The Genius of Free-Masonry* (1828); *Discourse on the Life and Character of De Witt Clinton* (1828); *Lectures on American Literature* (1829); *Sketches of Public Characters by Ignatius Loyola Robertson, LL.D.* (1830); *American Biography* (1833); *History of the United States* (1834); *Life of Thomas Eady* (1834); *Advice in the Pursuit of Literature* (1835); *Memoirs of the Life of Daniel Webster* (1835); *Life of Aaron Burr* (1835); *Life of Andrew Jackson* (1835); *The Bachelor and Other Tales* (1836); and *Female Biography* (published posthumously in 1843).

KNAUS, LUDWIG, a German painter born at Wiesbaden in 1829. He studied under Jacobi, and afterwards under Sohn and Schadow at Düsseldorf. His admirable pictures of German peasant life soon made him famous. After residing in Paris from 1853 to 1861, Knaus lived in Düsseldorf. Among his best pictures brought to America are *The Old Bear*, *My Little Brother*, and *Priest and Poacher*. His works are rich in humor and command high prices.

KNAPESHIP, in old Scotch law, a certain quantity of grain or meal to which the servant (knaive) of the mill was legally entitled.

KNEELAND, ABNER (1774-1844), an American editor. For a time he was a Baptist clergyman, then a Universalist and finally a Pantheist. From 1821 to 1823 he edited a Universalist magazine in Philadelphia, Pa., and in 1828 the "Olive Branch and Christian Enquirer," in New York City. In 1832 he founded the "Investigator" in Boston, and in 1836 was tried before the supreme court for blasphemy. He published *A Columbian Miscellany* (1804); *The Deist* (1822); *A Translation of the New Testament From the Greek* (1822); *Lectures on Universal Benevolence* (1824); *Lectures on the Doctrine of Universal Salvation* (1824); and *Review of the Evidences of Christianity* (1829).

KNEELAND, SAMUEL, an American naturalist, born in 1821. He studied medicine in the United States and in France, and then began the practice of his profession in Boston, Mass., also acting as demonstrator of anatomy in Harvard Medical School from 1845 to 1848. During the civil war he was a surgeon in the army, and in 1866 was mustered out with the brevet rank of lieutenant-colonel. From 1867 to 1869 he was instructor in the Massachusetts Institute of Technology, and from 1869 to 1878 professor of zoology and physiology. He has since devoted himself to literature, and has written *Science and Mechanism* (1854); *The Wonders of the Yosemite Valley and of California* (1871); and *An American in Iceland* (1876).

KNIGHTS OF LABOR. See LABOR in these Revisions and Additions.

KNIGHTS OF PYTHIAS, a benevolent and friendly order, founded Feb. 19, 1864, at Washington, D. C., by Justus H. Rathbone. It is intended to disseminate the principles of friendship, charity and benevolence, and nothing of a political or sectarian character is permitted to exist. The early growth of the society was very slow, there being at the end of the year 1865 only one lodge, with a membership of 52. From that time on new lodges were rapidly founded, and at present (1891) there are grand lodges in every State of the Union, with a total membership of 263,847.

A table showing the various grand lodges, with their respective memberships, is given below:

Grand Lodges.	No. of Members.	Grand Lodges.	No. of Members.
Alabama.....	2,927	Nebraska.....	5,510
Arizona.....	854	Nevada.....	785
Arkansas.....	2,522	New Hampshire.....	2,261
California.....	10,279	New Jersey.....	9,781
Colorado.....	2,734	New Mexico.....	623
Connecticut.....	8,570	New York.....	14,000
Dakota.....	996	North Carolina.....	886
Delaware.....	1,106	Ohio.....	28,426
Dist. of Columbia.....	1,145	Ontario.....	945
Florida.....	617	Oregon.....	1,456
Georgia.....	2,152	Pennsylvania.....	41,041
Illinois.....	13,571	Rhode Island.....	2,220
Indiana.....	17,897	South Carolina.....	1,311
Iowa.....	12,021	Tennessee.....	3,767
Kansas.....	8,898	Texas.....	5,547
Kentucky.....	3,341	Utah.....	427
Louisiana.....	5,046	Vermont.....	252
Maine.....	743	Virginia.....	3,096
Maritime Provinces.....	507	Washington.....	2,489
Maryland.....	6,697	West Virginia.....	2,257
Massachusetts.....	8,108	Wisconsin.....	3,406
Michigan.....	5,828	Wyoming.....	456
Minnesota.....	3,294	Subordinate lodges.....	806
Mississippi.....	2,511		
Missouri.....	7,564		
Montana.....	1,005		
		Total.....	263,847

The phrase, "subordinate lodges," above, designates lodges in Manitoba, Northwest Territory, Ok-

lahoma and the Hawaiian Islands, where there are no grand lodges. Membership of the uniform rank (military branch) 29,070. Membership of the endowment rank (life insurance branch), 21,255, representing an endowment of \$45,776,000. The office of the supreme keeper of records and seal is at Nashville, Tenn.

The following list gives the names of the officers of the Supreme Lodge of the world:

Sitting Past Supreme Chancellor—William Ward, New Jersey.
Supreme Chancellor—George B. Shaw, Wisconsin.
Supreme Vice-Chancellor—W. W. Blackwell, Kentucky.
Supreme Prelate—E. T. Blackner, California.
Supreme Master of Eschequer—S. J. Willey, Delaware.
Supreme Keeper of Records and Seal—R. L. C. White.
Supreme Secretary of the Endowment Rank—W. B. Kennedy, Illinois.
Major-General of the Uniform Rank—J. R. Carnahan, Indiana.
Supreme Master-at-Arms—G. H. Morrison, Nevada.
Supreme Inner Guard—M. C. Barkwell, Wyoming.
Supreme Outer Guard—John W. Thompson, District of Columbia.

KNIGHTSTOWN, a village of Henry county, Ind., situated on Blue River, 84 miles east of Indianapolis. It is the seat of an academy and contains machine-shops, mills, a bank, and three newspaper offices.

KNIGHTSVILLE, a village of Clay county, Ind., in the centre of the block coal region of the State. It is a great shipping point for freight between Indianapolis and St. Louis, and has extensive blast-furnaces, and manufactures sashes and doors.

KNOBEL, KARL AUGUST, a German theologian, born at Tzschschelin, Lusatia, in 1807, died at Giessen in 1863. After studying theology at Breslau he became professor extraordinary of theology at the University of Breslau in 1835, and four years later professor of the same branch at Giessen. His hermeneutics of the Old Testament, especially the commentaries on *Ecclesiastes*, *Isaiah*, and the *Pentateuch*, have a high standing. He also published *Prophetismus der Hebräer und Völkerinsel der Genesis*.

KNOLLYS, HANSARD (1598-1691), an English clergyman. In 1629 he was made deacon of the Church of England, and shortly afterward priest. Having become a Baptist, he came to America in 1638, and the same year settled in Dover, N. H., and there founded a church, probably the first in that State. In 1641 he returned to England, and in 1645 was formally ordained pastor of the Baptist church which he had gathered in London. He retained this charge until his death. He wrote *Flaming Fires in Zion* (1646); *Rudiments of Hebrew Grammar* (1648); and *Autobiography* (1672).

KNORTZ, KARL, a German American translator and author, born in 1841. He was educated at Wetzlar, London, and Heidelberg, and in 1864 emigrated to the United States, shortly afterwards becoming a Unitarian minister. Since 1882 he has resided in New York. He has published besides translations of poetry, *Märchen und Sagen der Nord-amerikanischen Indianer* (1871); *Amerikanische Skizzen* (1876); *American Shakespeare Bibliography* (1876); *Humoristische Gedichte* (1877); *Longfellow, Eine Literaturhistorische Studie* (1879); *Aus dem Wigwam* (1880); *Kapital und Arbeit in Amerika* (1881); *Aus der transatlantischen Gesellschaft* (1882); *Staat und Kirche in Amerika* (1882); *Shakespeare in Amerika* (1882); *Amerikanische Lebensbilder* (1884); *Eines deutschen Matrosen Nordpolfahrten* (1885); *Representative German Poems* (1885); *Göthe und die Wertherzeit* (1885); *Brook Farm and Margaret Fuller* (1886); and *Gustav Seyffarth* (1886).

KNOWLES, JAMES, an English architect and editor, born in 1831. He studied architecture under

his father and in Italy, and afterward executed some fine architectural work in London. In 1870 he became editor of the "Contemporary Review," making it an influential paper, and in 1877 he assumed the editorship of the "Nineteenth Century," on the plan of permitting writers of ability to discuss questions of public interest over their own signatures.

KNOWLTONIA, a genus of South African plants of the natural order *Ranunculaceæ*. *K. Vesicaria* is remarkable for its acridity and for its blistering power. The bruised leaves are used at the Cape of Good Hope instead of cantharides.

KNOX, HENRY (1750-1806), an American general. See UNITED STATES, in Britannica, Vol. XXIII, p. 789.

KNOXVILLE, a city of Knox county, Ill., fifty miles west of Peoria. It is the seat of the Illinois Protestant Episcopal diocesan school for girls, and of a Swedish college. Coal-mining and manufacturing are carried on, and carriages, plows, wagons, flour and woolen goods are produced.

KNOXVILLE, a village, county-seat and railroad-center of Marion county, Iowa, situated 40 miles southeast of Des Moines. It has an iron-foundry, steam-mills and woolen factories.

KNOXVILLE, a city of Tennessee, county-seat of Knox county, and the chief city of East Tennessee. It lies on the north bank of Holston River, at the head of steam navigation. Knoxville is one of the oldest towns of the State and was the first state capital. Its situation is elevated and the surrounding country is very beautiful. The city is at the junction of the Knoxville & Charleston and Knoxville & Ohio railroads. The East Tennessee, Virginia & Georgia Railroad passes by it. It does a large wholesale and retail trade. The leading manufactures are machinery, carwheels, nails, flour, lumber and wooden ware. They are increasing and the city is growing in wealth. Knoxville is the seat of the University of Tennessee and the State Agricultural College, also of the Tennessee School for Deaf Mutes, and of the Austin Industrial School for Colored Pupils. Population in 1890, 22,447. See Britannica, Vol. XIV, p. 134.

KNUTSFORD (Canute's ford), town of Cheshire, England, fifteen miles southwest of Manchester. It has manufactories of cotton, worsted and leather goods. Population, 1881, 4,290.

KNYPHAUSEN, BARON DODO HENRY, a German general, born in 1730, died at Berlin in 1789. He entered the Prussian army as a youth and served under Frederick the Great against Austria. After being made lieutenant-general, in 1776, he fought against the Americans as one of the corps of Hessians hired by England. He took part in the battles of Long Island, White Plains, Fort Washington and Brandywine. While in command at New York he made two raids into New Jersey, in which he sacked the village of Connecticut Farms and burnt Springfield.

KOALA (*Phascolarctos cinereus*), tailless marsupial of Australia, also called Australian bear. See MAMMALIA, Britannica, Vol. XV, pp. 382, 383.

KOBELL, FRANZ VON (1803-1882), a German mineralogist and poet, born at Munich in 1803, died there in 1882. In 1834 he became professor of mineralogy at the University of Munich, and from 1860 to 1866 he wrote a history of mineralogy. He also published *Hochdeutsche Gedichte*, a book of poems, and *Die Urzeit der Erde*. Many of his dialect poems were widely circulated in Germany.

KOCH, KARL, a German naturalist, born at Weimar, June 6, 1809, died at Berlin, May 27, 1879. He studied at the universities of Würzburg and Jena, in 1836 undertook a scientific journey to

Southern Russia, and in 1843-44 visited Armenia, Kurdistan, Transcaucasia and the Crimea. In 1836 he was appointed extraordinary professor of Botany at Jena, and in 1843 at Berlin. His chief work is his *Dendrologie* (1869-72).

KOCH, ROBERT, an eminent German bacteriologist, born in 1843 at Klausthal in the Harz Mountains, and educated at the University of Göttingen, Germany, where he graduated. Soon after taking his degree he established himself in a village near Hanover and began to practice as a physician. Finding, however, that it was impossible to make ends meet, he migrated to Rackwitz, a malarious little town in Prussian-Poland, which he subsequently deserted for Wollstein. It was while there that his name came before the public, in 1880, as an expert in connection with the famous Speichert poisoning case. The conviction of the prisoner in this *cause célèbre* was entirely owing to the remarkable analyses and medical testimony of Dr. Koch, which attracted such widespread attention by reason of their profound erudition that he was summoned to Berlin to take his seat as a member of the Sanitary Commission of the metropolis and as a professor of the Royal School of Medicine. Two years later (in 1882) Dr. Koch made the great discovery that tuberculous diseases were due to the existence of bacilli—a discovery that excited the attention of the entire medical world. He announced with the greatest emphasis that all tuberculous disease depends upon the presence of a specific germ, which he called the *bacillus tuberculosis*. His experiments demonstrated that the germ exists in the tissues of all consumptive patients; that if this germ were lodged in the bodies of animals previously healthy they would die of tuberculosis; that there is no tuberculosis without this germ, and that the disease is propagated by the transmission of this germ, and not otherwise. Thenceforth Dr. Koch devoted his entire efforts to finding some rival microbe or chemical antidote powerful enough to neutralize the operations of the tuberculous bacilli. In 1883 his labors in this direction were interrupted by his being placed at the head of the medical commission dispatched by the German government to Egypt and India for the purpose of making researches into the origin and the causes and prevention of cholera. It was while at Calcutta that he succeeded in discovering in the water of a native cistern the comma-like germ or microbe of the cholera, for which until now no one has succeeded in discovering any antidote. On his return to Germany he was rewarded by the government for his researches with an honorarium of 100,000 marks, with the rank of Privy Councillor, and with the rectorship of the imperial institute of Hygiene.

Soon after his return Dr. Koch resumed his researches, and in September, 1890, startled the medical world by the announcement that he had discovered a remedy which would destroy the bacillus tuberculosis and expel it from the human system without injuring the tissues in which the germ is doing its deadly work. (For a full description of the discovery see the article BACTERIUM in Vol. I, pp. 182-185, of these Revisions and Additions. Dr. Koch's works include *Zur Ätiologie des Milzbrandes* (1876), *Untersuchungen über die Ätiologie der Wundinsektions-Krankheiten* (1878) and *Ueber die Milzbrandimpfung* (1882).

KOKOMO, a city and county-seat of Howard county, Indiana, on the Wild Cat river, fifty-four miles north of Indianapolis. It has fine railroad facilities and manufactures hubs and spokes, doors, furniture, flour and woolen goods. It has banks,

churches, high-schools and several weekly newspapers. Population, 8,224.

KOLA, the most northern town of European Russia. It is situated on the peninsula of Kola, is the capital of Russian Finland, and has a capacious harbor. Population, 770. The Peninsula of Kola is a dreary expanse of forests and lakes, but has several ranges of mountains, one of which, the Umbdek Mountains, on the east side of Lake Imandra, rises to 3,300 feet.

KOLLAČ, JAN, a Slavic poet, born at Mossocoz, in northwestern Hungary, in 1793, died at Vienna in 1852. In 1819 he became pastor of a Slavic Protestant congregation at Pesth, and in 1849 he was made professor of Slavic archæology in the University of Vienna. He wrote poems in the Czech language, which poems very powerfully influenced the spirit of his race. In a treatise *Ueber die literarische Wechselseitigkeit zwischen den Stämmen und Mundarten Slavischer Nationen* he advocates the use of a common Slavic literary language for the unification of the various branches of his race.

KÖLLIKER, RUDOLPH ALBRECHT, a Swiss physiologist, born at Zürich in 1817. After being educated at the Universities of Zürich, Bonn and Berlin he entered upon microscopic investigations which made him famous. In 1849 he became professor of anatomy at Würzburg, and assisted in founding a medico-physical society there. His works on histology and physiology are acknowledged as standards and have been translated into most European languages. Among Kölliker's works are *Mikroskopische Anatomie; Handbuch der Gewebelehre des Menschen*, and *Grundriss der Entwicklungsgeschichte*.

KONIGSWARTH, a town of Bohemia, fifteen miles south-southwest of Elbogen, with mineral springs. Its noble castle, the property of Prince Metternich, contains a splendid collection of works of art. Population, 1,767.

KOORIA MOORIA ISLANDS, a group of six islands on the south coast of Arabia, the only inhabited one of which supports from twenty to thirty fishermen. They were ceded to England in 1854. Guano of inferior quality is obtained from them.

KOPECK, a small bronze coin of Russia.

KORA WOOD or Cocus Woon, a wood of the Indian tree, *Lepidostachys Roxburghii*, which belongs to the very small natural order, *Scepaceæ*. It is imported in logs of six or eight inches in diameter, having the heart-wood of a deep brown color and very hard. It is much used in the manufacture of musical instruments.

KOSCIUSKO, the county-seat of Attala county, Miss., situated in the center of the state, on Yockanockany creek, and on a railroad. Its chief industry is raising and shipping cotton.

KOSSUTH, LOUIS, leader of the Hungarian Revolution, born at Monok in Hungary in 1806. In 1832 he commenced his political career at the Diet of Presburg as the proxy of a Hungarian magnate or member of the Upper House. Afterward he published a lithographed liberal paper at Pesth, but the government prohibited its issue. Kossuth was arrested in 1837, tried for high treason and condemned to four years' imprisonment. He was released after 18 months' confinement because the Liberals in the diet refused to grant supplies to the government unless he were set free. In 1847 elected to the Diet, he soon became its leader. On the dissolution of the ministry in September, 1848, he became the head of the Committee of National Defense. For the events of the revolutionary war of 1848-9 the reader is referred to the article on HUNGARY in the Encyclopedia Britannica. In 1849

Kossuth, who had been dictator of Hungary, fled to Turkey, where he was made a prisoner. In 1851 he was liberated and sailed to England, and afterwards to the United States, where he met with a most enthusiastic reception. In 1852 he returned to England, residing there until the Italian war of 1859 broke out. He resides now at Turin. Many of his speeches were published in the *Europäische Bibliothek* in 1860-70. See *Britannica*, Vol. III, p. 137; Vol. XII, p. 371.

KRAKEN, a fabulous animal said to have been seen in the Norwegian seas. Its back is described as about a mile and a half in circumference; it rises from the sea like an island, stretches out mast-like arms capable of dragging down the largest ships, and when it sinks again into the deep causes a whirlpool in which large vessels are involved to their destruction; it also makes the waters around it thick and turbid. The fable of the kraken has considerable analogy to the more recent stories of the sea-serpent.

KRAPOTKIN, PRINCE PETER ALEXICVITCH, a Russian anarchist, born at Moscow in 1842. He was aide-de-camp to the military governor of Transbaikalia, in Eastern Siberia, in 1863-7, during which time he made many journeys in Siberia and Manchuria. After studying at St. Petersburg from 1868 to 1872 he joined the most advanced anarchist section of the International Workingmen's Association in Belgium. He then returned to Russia, took part in the Tchaikosky conspiracy, was arrested, and after two years' imprisonment escaped to England. In 1879 Krapotkin founded the anarchist paper "La Revolté" at Geneva, whence he was expelled in 1881. Then he commenced a crusade against the Russian government in the English and French press. But in 1882, while on a visit to Thonon, a French town on the south bank of the Lake of Geneva, he was arrested and condemned by the Police Correctionnelle at Lyons to five years' imprisonment for participating in the International Workingmen's Association. In 1886 he was released and returned again to England. Krapotkin is a frequent writer and able lecturer on socialistic questions.

KRASINSKI, ZYGMUNT NAPOLEON, Count, a Polish author, born at Paris, in 1812, died in 1859. He lived at various European capitals, and published many volumes of patriotic poems. Among his most noted works are *Kiebosca Komedia*, which furnished the material to Owen Meredith's *Fool of Time* and *Psalmprzypyszlosci*. A collected edition of Kransinski's works appeared at Leipzig, in 1863.

KRAUSE, KARL CHRISTIAN FRIEDRICH, a German philosopher, born at Eisenberg, May 6, 1781, died at Munich, Sept. 27, 1832. He studied philosophy at Jena, under Fichte and Schelling, and qualified as a *privat-docent* in that university in 1802, but removed in 1805 to Dresden, where he lived till 1813. After residing for a time in Berlin, lecturing in the university there, he settled in Göttingen, where he lectured on all the branches of philosophy, and drew around him a number of enthusiastic disciples. In 1831 he removed to Munich. Krause is deservedly ranked as one of the masters of the German philosophical movement inaugurated by Kant. The most popular of his writings is his ideal of humanity (*Das Urbild der Menschheit*, 1812), which has been rendered into Spanish, Italian and English.

KRAUTH, CHARLES PORTERFIELD (1823-1883), an American clergyman. In 1841 he entered the Lutheran ministry, and was pastor successively of Lutheran congregations in Baltimore, Winchester, Va., and Pittsburgh and Philadelphia, and in 1864 became professor of systematic theology in the Lutheran Theological Seminary, in the last named

city. In 1868 he was made professor of intellectual and moral philosophy in the University of Pennsylvania, and in 1873 was chosen vice-provost of that institution. Besides many translations, he published *Christian Liberty in Relation to the Usages of the Evangelical Lutheran Church Maintained and Defended* (1860); *The Conservative Reformation and its Theology* (1872); *Ulrici's Review of Strauss* (1874); *Berkeley's Principles, Prolegomena, Notes of Neberweg, and Original Annotations* (1874), and *Chronical of the Augsburg Confession* (1878).

KREMS, a town of lower Austria, at the confluence of the river Krems with the Danube, 47 miles from Vienna. Population, 11,042.

KRONENBERG, an iron manufacturing town of Rhenish-Prussia, four miles south of Elberfeld. Population, 8,358.

KROSSEN, or CROSSEN, a walled town of Prussia, on the left bank of the Oder, 42 miles southeast of Frankfort. It has manufactories of woolen, linen, leather, and earthenware. Population, 6,786.

KRUPP, ALFRED, a German iron-worker and steel-gun manufacturer, born at Essen, in Westphalia, in 1810, died in 1887. When Alfred was 14 years of age, his father died, leaving a small iron forge shop for the support of his widow and son. In 1848 the shop was taken over by Alfred. At first he employed only two workmen. Krupp soon after discovered the method of casting steel in very large masses. After this discovery the progress of his works became very rapid. In 1851 he sent to the London exhibition a block of steel weighing 4,500 pounds. But he was able to cast steel in one mass weighing 200 tons. Beside rails, tires, wheels, engines, and all kinds of cast-steel work, Krupp manufactured principally the large steel guns with which the Germans did such terrible execution when they besieged Paris. These guns are all "built up" by shrinking steel hoops over a central steel tube. There is a single layer of hoops around the tube for guns below nine inch calibre, while those above this size have two layers of hoops in the after parts. Some 20 years ago the Krupp steel guns were bought in large numbers by all the European powers, and Krupp had to extend his works time and again to fill the pressing orders; so that now over 20,000 workmen are employed in them. They include the extensive foundries and shops at Essen; the coal mines at Essen and Bochum; several iron mines in Germany and Spain; a series of smelting furnaces, and some branch works at Nerdweid and Layn. In 1864 Krupp declined to accept the letters of nobility offered him by the king of Prussia. He was one of the wealthiest men in Germany, and did a great deal for the welfare of employes and their families. But he kept some of his processes jealously secret. A commission appointed some years ago by the United States Government to study his system of making large castings for steel guns, tried in vain to get Krupp's permission to enter his works, only workmen being admitted to his great foundries.

KUCKEN, FRIEDRICH WILHELM, a German musical composer, born at Bleckede, Lüneburg, in 1810, died at Schwerin, in 1882. He studied music at Berlin and published there his first opera, *Die Flucht nach der Schweiz*, which was a success. At Vienna he enjoyed afterwards considerable popularity. In 1843 he went to Paris, where he composed the opera *Le Prétendant*, and wrote many pieces of music to the words of Heine. For some time he was chapel-master to the king of Württemberg. Some of his compositions were gathered in *Les Echos de l'Allemagne*, and *Friedenshymne*. They are noted for the sweetness of their melodies.

KUENEN, ABRAHAM, a Dutch theologian, born at

Harlem, Holland, in 1828, became professor of theology at Leyden in 1855. He was a thorough student of the Old Testament. In his publication entitled *Histori-co-critical Investigation of the Origin and Collection of the Books of the Old Covenant*, he criticised the old books with much skeptical research, and was himself severely criticised for doing so. Afterwards he wrote his *Worship of Israel till the Overthrow of the Jewish State*, and lastly, his *Prophets and Prophecy in Israel*. Since 1867 he has edited the *Theologisch Tydschrift*.

KUFIC COINS, the early Mohammedan coins engraved with inscriptions in the Kufic or epigraphic Arabic character, as distinguished from the Neskhî or cursive writing. A. H. 76 and 77 (A. D. 695-96), the Calif Abd-el-melik issued gold coins with his own image instead of that of the Byzantine emperor; but the representation of living creatures being opposed to the law of Mohammed, this coinage was discontinued, and a reformed gold currency, engraved solely with Kufic inscriptions, was inaugurated A. H. 77. This was supplemented with a silver currency on similar lines A. H. 79, and the earliest dated copper coin appeared A. H. 80. The names of the Califs first appear on gold and silver under the Abbasids; but with this addition, and sometimes the names of governors and viziers, the gold and silver currency of the Moslem empire remained practically unchanged until the 4th century of the Hegira. During the whole of this period the Arabic character on the coins is still almost universally Kufic; but in the 4th century local peculiarities begin to appear, and various styles are developed, which may be termed transitional Kufic. Examples of these are seen in the coinage of the Ghaznavis of northwest India, and still more marked in the issues of North America and Spain. In the 7th century of the Hegira, the Kufic was generally superseded by the Neskhî character throughout the coinage of the Mohammedan world, and attained its greatest perfection on the currency of the dynasts of Granada and Fez, the shahs of Persia, and the rulers of Delhi. Kufic coins are of inestimable value to the historian, for they supply him generally with the names of kings, governors and Califs, and often a short pedigree of their ancestry, together with the city where they struck the coins and the date of the issue.

KÜHNER, RAPHAEL, a German philologist, born at Gotha, in 1802, died at Hamburg, in 1878. After studying philology at the University of Göttingen, he became a teacher in the lyceum at Hanover, in 1825, and there devoted himself chiefly to the Greek language and to Cicero. His *Ausführliche Grammatik der Griechischen Sprache* arranges the syntax of that language on scientific principles and marks a new epoch in the teaching of Greek. Kühner's *Elementary Greek Grammar* and his *Elementary Grammar of the Latin Language* passed through numerous editions and translations in Germany, England, and America.

KUNG-CHIN-WANG, known as PRINCE KUNG, a Chinese statesman, born in 1833. Being emperor Hin-Fung's brother he was in 1861, when Hin-Fung died, made one of the regents, as the new emperor, Tung-Che, was then only 7 years old. For the suppression of the Taping rebellion which occurred while he was a regent, he availed himself largely of the assistance of foreigners. In 1866 and again in 1869, Prince Kung went on special embassies to Europe and America. When, in 1874, he concluded peace with Japan after the Formosan troubles, he was accused of having yielded too much to foreign influence, and was condemned to death. But on the next day an imperial decree restored him to his

former high office. In the difficulties with France in 1883-84, Prince Kung's conduct gave his enemies again an opportunity to drive him from power. This prince is noted for his steady endeavors to introduce the ideas, methods, and inventions of modern European civilization into China, and he has largely succeeded in so doing, in spite of many hindrances and a powerful inimical clique. When General Grant visited China, Prince Kung entertained him royally.

KUNIGUNDE, St., wife of Duke Henry of Bavaria, who was crowned king of the Germans in 1002, and emperor in 1014. According to legend she vindicated her chastity by walking barefoot over hot ploughshares. After her husband's death in 1024, she retired into the convent of Kaufungen, near Cassel, which she had founded, and here she died, March 3, 1040. Pope Innocent III. canonized her in 1200.

KUNZE, JOHN CHRISTOPHER (1744-1807), an American clergyman. In 1770 he was called to the Lutheran congregations in Philadelphia, Pa., and from 1780 to 1784, was a professor in the University of Pennsylvania. He then accepted a call to New York City, where he labored until his death. Among his published works are *Concise History of the Lutheran Church; Something for the Understanding and the Heart; A Table of a New Construction for Calculating the Great Eclipse Expected to Happen June 16, 1806; Hymn and Prayer Book, for the Use of Such Lutheran Churches as Use the English Language* (1795), and a *Catechism and Liturgy* (1795).

KUPFER-SCHIEFER, one of the series of strata which made up the "Dyas" type of the Permian system as it is developed in Germany. The organic remains are abundantly coated and even replaced with copper ore, which has been extensively worked along the flanks of the Harz. See *Britannica*, Vol. X, p. 351.

KURNOOL, KARNUL, or CARNOUL, the chief town of a district of the same name in the presidency of Madras, in latitude 15° 50' north, and longitude 78° 5' east. The district itself contains about 7,470 square miles. The country possesses considerable works for the purpose of irrigation. Population, 956,068.

KURTZ, BENJAMIN (1795-1865), an American Lutheran clergyman. In 1815 he was licensed to preach, and then for 16 years was pastor at Hagerstown, Md. From 1831 to 1833, he had charge of the "Lutheran Observer," a post which he held for nearly 30 years. Among his works are *First Principles of Religion for Children* (1821); *Sermons on Sabbath Schools* (1822); *Faith, Hope, and Charity* (1823); *Infant Baptism and Affusion, with Essays on Related Subjects* (1840); *Why are You a Lutheran?* (1847), and *Lutheran Prayer Book* (1856).

KURTZ, JOHANN HEINRICH, a German theologian, born at Montjore, near Aix-la-Chapelle, Dec. 13, 1809. He was first destined for a commercial career, but early devoted himself to the study of theology at Halle and Bonn, and became in 1835 religious instructor at the gymnasium of Mitau, and in 1850 professor of church history at Dorpat. He retired from active service in 1870. His writings are numerous, and some of them have been exceedingly popular, as the *Lehrbuch der Heiligen Geschichte* (1843, 16th ed. 1883), *Biblische Geschichte mit Erläuterungen* (1847, 34th ed. 1882), and *Abriß der Kirchengeschichte* (1852, 11th ed. 1886). His most important books, however, are those devoted to church history, his *Handbuch der Allgemeinen Kirchengeschichte*, and *Lehrbuch der Kirchengeschichte für Studierende*.

KÜSTENLAND, or LITTORALE, a crown-land of Austria, consisting of the principality of Goritz and

Gradisca, the markgratdom of Istria, and the town of Trieste with its territory. It lies between the crown-land of Carniola on the northeast and the Gulf of Venice on the southwest. The surface is mountainous and the chief rivers are the Isonzo and the Quieto. The soil is in general fruitful and wine is extensively made. In the mountainous districts in the North and Northeast the breeding of cattle is the chief industry. Commerce is carried on at the various seaports. Area 3,075 square miles. Population, 647,943.

KUVERA, the Hindu Plutus, or God of wealth. He owes his name, which literally means "having a wretched body," to the deformities with which he is invested by Hindu mythology. He is seated in a car which is drawn by hobgoblins. His residence is situated in the mines of Mount Kailasa, and his garden is the abode of all riches. Nine treasures, presumably gems, are especially entrusted to his care. His wife is a hobgoblin.

KWICHPAK, or HWIKHPAK, one of the outlets of the Yukon, Alaska. It is 52 miles long, and is broad and shallow. The Russians also give this name to the whole river. See *Britannica*, Vol. I, p. 444.

KYANITE, or CYANITE, a mineral of a blue color, a silicate of aluminium, and of the same composition as andalusite and fibrolite. See *Britannica*, Vol. XVI, p. 408.

KYANIZING, a process for preventing decay in wood by saturating it with a solution of corrosive sublimate. The process is named from its inventor.

KYLE, JAMES H., United States Senator from South Dakota, a clergyman, born in Centerville, Ohio, in 1854. He graduated from Oberlin (Ohio) College in 1878, and studied theology in the Western Theological Seminary, Allegheny, Pa. He was for 3 years a teacher of mechanical and civil engineering in Pittsburgh, Pa., and studied law; was pastor of a church in Salt Lake City, Utah, 4 years, and was an officer of the Utah commission; was a pastor in Ipswich, S. D., and Aberdeen, S. D.; was financial agent of the Congregational College at Yankton, S. D. In politics he is a believer in the principles of the Farmer's Alliance, and was elected a State Senator in 1890. In 1891 he was elected by the South Dakota legislature to the United States Senate, to succeed Gideon C. Moody.

KYRIE ELEISON, "Lord have mercy," the only form of prayer used in the mass of the Roman Catholic church which has never been translated into Latin out of the Greek of the early church service. In the church of England and in the Protestant-Episcopal church service it is the name given to the response to the commandments.

L

LAAGER—LABOR

LAAGER, a South African word meaning an encampment more or less fortified. The original laager of the Boers was an inclosure formed by drawing together several wagons, within which inclosure the cattle could be herded at night.

LAALAND, or **LOLLAND**, a Danish island in the Baltic, at the southern entrance to the Great Belt, 36 miles long by 9 to 15 broad. The surface is remarkably flat, and the soil exceedingly fruitful. Forests of beech and oak cover upwards of 50 square miles. Area 445 square miles. Population (1880) 64,420. The capital is Maribo, and the largest town Nakskov, with a good harbor and considerable trade.

LABARRAQUE'S SOLUTION, a solution of chlorinated soda, *liquor sodæ chloratæ*, formed by mixing the solution of sodic carbonate with that of the best bleaching-powder. It is used as a disinfectant.

LABIATÆ, a natural order of exogenous plants, containing almost 2,500 known species, mostly natives of temperate climates. They are herbaceous, and have four-cornered stems and opposite branches; also opposite leaves without stipules, abounding in receptacles of volatile oil. The flowers are often in cymes or heads, or in whorls, or sometimes solitary. Some are used in medicine. Mint, rosemary, lavender, sage, etc., are examples of this order.

LABICHE, **EUGÈNE MARIN**, a French dramatist, born at Paris May 5, 1815, died Jan. 23, 1888. He was educated at the College Bourbon and studied law, but afterwards decided to devote himself entirely to literature. His first dramatic piece was the popular farce *M. de Coyllin* (1838), which was followed during the next 40 years by a series of over a hundred comedies, farces and vaudevilles. He collaborated with Gondinet, Delacour, E. Legouéré, Angier and other dramatists. Labiche was elected to the Academy in November, 1880. Among the most important of his pieces are *Le Chapeau de Paille d'Italie* (1851); *L'Affaire de la Rue de Lourcine* (1857); *Les Petites Oiseaux* (1863); *La Cagnotte* (1864); *Le plus Heureux des Trois* (1870) and *La Clé* (1877).

LABLACHE, **LUIGI**, an Italian singer, born at Naples, Dec. 6, 1794, died there Jan. 23, 1858. His first engagement as a singer was at the San Carlo Theatre, at Naples, in 1812. He afterwards sang with much success at Palermo, Milan, Rome, Turin and Vienna; in the last-named city a medal was struck in his honor. From 1830 to 1857 he sang alternately in Paris and London, making occasional visits to St. Petersburg and Naples. His voice, a deep bass, has hardly ever been equalled, either in volume or quality; and his acting, particularly in the characters of Figaro, Don Bartolo, Don Pasquale, Leporello, etc., was almost as remarkable.

LABOR and **LABOR ORGANIZATIONS**. For the general history of LABOR, see *Britannica*, Vol. XIV, pp. 165-175.

The terms "labor" and "labor question" stand for the wants and demands of the wage-workers. The demands are directed against the capitalists, the employers of labor. They aim at an equitable distribution of the profits derived from labor, the laws of ethics and economics being in favor of such

distribution. The labor question of to-day and social science are nearly synonymous terms. It is the broadened and deepened intelligence of the working people which has widened their demands to such proportions that they are now made not only to their employers, but upon the State legislatures, the United States Congress, and the entire body politic. Under the present system of competition the workingman's wages are not paid according to his necessities, but according to his capability and efficiency. The output of finished work is the measure of his pay.

The United States have now about 20,000,000 of wage-workers, comprising four to five males to one female. Any stoppage in the industrial progress throws out of employment large numbers of these people, and involves a great loss to the country. A general reduction of wages at any time produces a similar loss. As these losses bear on the consuming power of the country they affect indirectly all classes of inhabitants. It is clear that the best-paid conditions of labor in general mean the best economic condition of the whole country, all other things being the same. Whereas, on the other hand, if a large proportion of the great number of workers is subsisting on a low consumption of products there must ensue stagnation of industrial prosperity, depression of employment, cessation of house and railroad building, etc., as the inevitable result.

As the increased intelligence of the workmen increases their wants and demands, *pari passu*, and the aggregation of large numbers confers upon them greater power for enforcing their demands, the wage-workers of all free countries have formed powerful labor organizations during the last 20 years. But each organization involved only the workers in a particular industry in a particular locality. There was no cohesiveness between the several organizations. They could, consequently, have very little influence as a whole.

In order to give them greater influence the American workmen have built up a centralized and well-organized association, under the name of the "Knights of Labor." (See *Britannica*, Vol. XXIII, pp. 786-787.) It comprises the intelligence of the wage-earners of this country, and is radically different from the Internationals of Europe, who are imbued with the principles of revolutionary socialism, communism, anarchism and nihilism, and cannot free themselves from such principles. The Knights of Labor are a secret order under the guidance of able leaders, who comprehend the labor question in its entirety, and seek to bring about the highest results by legitimate propaganda, instead of revolutionary means. They are organized on a basis which appeals to the sympathy of the general public. Their order has therefore grown rapidly, not only in numbers, but also in power and social and political influence as well. The platform of the Knights of Labor, as adopted at Philadelphia in September, 1884, proclaims its desire to make moral and industrial worth, not wealth, the true standard of individual and national greatness, to secure to the workers the full and equitable share of the wealth they create, with sufficient leisure to improve themselves and their

families, and their just share in the benefits and pleasures of advancing civilization. In order to secure these results the Knights of Labor demand that each State shall establish bureaus of labor for giving information of the financial, moral and educational condition of the working masses. They demand that public lands be reserved for actual settlers, that no more land-grants shall be made to railroads, and that all lands now held for speculative purposes shall be taxed to their full value. They demand the abrogation of all laws that do not bear equally on capital and labor, and the removal of unjust legal technicalities, delays and discriminations in the administration of justice. They also ask for the adoption of laws that provide for the health and safety of men engaged in the mining, building and manufacturing industries, and an indemnification for injuries received through lack of necessary safeguards; also the recognition, by incorporation, of trades-unions, orders and such associations as may be organized by the working masses to improve their condition and protect their rights. They demand frequent payments in lawful money, and the right of a mechanic to a first lien upon the products of his labor to the extent of his wages in full. They also ask for legislation which shall abolish the contract system on State, National and Municipal works; which shall provide for arbitration between employers and employes; which shall prohibit the employment of children in workshops, mines and factories, and the hiring out of convict labor. They also ask that a graduated income-tax be instituted. They protest against the importation of foreign labor under contract. They

demand the establishment of post-office savings banks, and that the government shall obtain possession, by purchase, of all business relating to transportation of passengers, freight and intelligence. They pledge their own endeavors to secure the introduction of a co-operative industrial system which shall in time supersede the wage system; to secure equal pay to both sexes for equal work; to lessen the hours of labor, and to persuade employers to have all differences between themselves and their employes arbitrated, in order to render strikes unnecessary in the future.

Most men can endorse the aims of the Knights of Labor as represented in the above platform. It is the aim of their leaders to seek reforms very gradually, partly by the ballot-box, but principally by a better education of the masses, so that they can fully see their own degradation, and also get the moral stamina to lift themselves out of it and up to a higher plane. The final success depends upon universal education and the moral rectitude of the laboring masses. This is what their energetic chief, Mr. T. V. Powderly, fully recognizes, as well as that success will be attained only by steady, slow and almost imperceptible development. In the end the adjustment of labor difficulties must rest upon the general recognition of human rights, which cannot be ignored by the employers.

The first Industrial Congress convened at New York, Oct. 12, 1845. The first National Labor Congress met at Baltimore, Aug. 20, 1866. The Knights of Labor were organized at Philadelphia in 1869. Congress created a National Bureau of Labor in 1884, and this was erected into an independent department of the Government in 1888.

BUREAUS OF LABOR AND LABOR STATISTICS IN THE UNITED STATES.

Title of Bureau.	Where Located.	When Organized.	Chief Officer.	Title.
United States Department of Labor.....	Washington, D. C.....	1885	Carroll D. Wright.....	Commissioner.
Bureau of Statistics of Labor.....	Boston, Mass.....	1869	Horace G. Wadlin.....	Chief.
Bureau of Industrial Statistics.....	Harrisburg, Pa.....	1872	Albert S. Bolles.....	Chief.
Bureau of Labor Statistics.....	Hartford, Conn.....	1873	Samuel M. Hotchkiss.....	Commissioner.
Bureau of Labor Statistics.....	Columbus, O.....	1877	John McBride.....	Commissioner.
Bureau of Statistics of Labor and Industries	Trenton, N. J.....	1878	James Bishop.....	Chief.
Bureau of Labor Statistics and Inspection...	Jefferson City, Mo.....	1876	Lee Meriwether.....	Commissioner.
Bureau of Labor Statistics.....	Springfield, Ill.....	1879	John S. Lord.....	Secretary.
Bureau of Statistics.....	Indianapolis, Ind.....	1879	William A. Peelle, Jr.....	Chief.
Bureau of Labor Statistics.....	Albany, N. Y.....	1883	Charles F. Peck.....	Commissioner.
Bureau of Labor Statistics.....	San Francisco, Cal.....	1883	J. J. Tobin.....	Commissioner.
Bureau of Labor and Industrial Statistics...	Lansing, Mich.....	1883	Alfred H. Heath.....	Commissioner.
Bureau of Labor Statistics.....	Madison, Wis.....	1883	H. M. Stark.....	Commissioner.
Bureau of Labor Statistics.....	Des Moines, Ia.....	1884	J. R. Sovereign.....	Commissioner.
Bureau of Labor Statistics.....	Baltimore, Md.....	1884	Thomas C. Weeks.....	Chief.
Bureau of Statistics of Labor.....	Topeka, Kan.....	1885	Frank H. Betton.....	Commissioner.
Bureau of Labor Statistics.....	Providence, R. I.....	1887	Almon K. Goodwin.....	Deputy Com.
Bureau of Labor Statistics.....	Lincoln, Neb.....	1887	John Jenkin.....	Commissioner.
Bureau of Labor and Industrial Statistics...	Raleigh, N. C.....	1887	J. C. Scarborough.....	Commissioner.
Bureau of Labor Statistics.....	Augusta, Me.....	1887	Samuel W. Matthews.....	Commissioner.
Bureau of Labor Statistics.....	St. Paul, Minn.....	1887	John Lamb.....	Commissioner.
Bureau of Labor Statistics.....	Denver, Col.....	1887	John W. Lackin.....	Deputy Com.
Bureau of Labor Statistics.....	Aberdeen, S. D.....	1890	John W. Lackin.....	Commissioner.
Department of Agriculture and Labor.....	Grand Forks, N. D.....	1890	H. F. Helgesen.....	Commissioner.
Bureau of Immigration, Labor and Statistics	Boise City, Id.....	1890		

In Nebraska, the Governor, and in Colorado the Secretary of State are ex-officio commissioners.

The first strike in this country occurred in the city of New York in 1803, when a number of sailors struck for an advance in wages. The tailors, in 1806, established the first trades-union. The first local union of printers was organized in 1831. The ten-hours' movement began as early as 1832, among the shipwrights and caulkers in New England, and was a failure. President Van Buren gave success to the ten-hours' movement when he established the system in the Government navy-yards in 1840, and President Johnson signed the first eight-hours' law, for the benefit of Government laborers, in 1868.

In California eight hours of labor constitute a day's work, unless it is otherwise expressly stipulated by the parties to a contract.

A stipulation that eight-hours' labor constitute a day's work must be made a part of all contracts to which the State or any municipal corporation therein is a party.

But in the case of drivers, conductors and grip-men of street-cars for the carriage of passengers, a day's work consists of twelve hours. It is a misdemeanor for any person having a minor child under his control, either as ward or apprentice, to require such child to labor more than eight hours in any one day, except in vinicultural or horticultural pursuits, or in domestic or household occupations.

In Connecticut eight hours of labor constitute a lawful day's work, unless otherwise agreed.

In Illinois eight hours are a legal day's work in all mechanical employments, except on farms, and when otherwise agreed; does not apply to service by the day, week or month, or prevent contracts for longer hours.

In New Mexico eight hours of labor actually performed upon a mining claim constitute a day's work, the value of the same being fixed at four dollars.

In New York eight hours constitute a day's work for mechanics, workmen and laborers, except in farm or domestic labor, but overwork for extra pay is permitted. The law

applies to those employed by the State or municipality, or by persons contracting for State work.

In Pennsylvania eight hours, between rising and setting of sun, constitute a day's work in the absence of an agreement for longer time. The law does not apply to farm labor or to service by the year, month, etc.

In Wisconsin in all engagements to labor in any manufacturing or mechanical business, where there is no express contract to the contrary, a day's work shall consist of eight hours; but the law does not apply to contracts for labor by the week, month or year.

In all manufactories, workshops or other places used for mechanical or manufacturing purposes, the time of labor of children under the age of eighteen, and of women employed therein, shall not exceed eight hours in one day.

The following States have laws which may be construed as prohibiting both boycotting and blacklisting: Dakota, Iowa, Kansas, Maine, Michigan, Minnesota, Montana, Nevada, New York, Tennessee and Utah.

The States having laws prohibiting boycotting are Illinois and Wisconsin.

The States having laws prohibiting blacklisting are Georgia, Illinois, Iowa, Pennsylvania and Wisconsin.

In New York it is a misdemeanor for any employer to exact an agreement, either written or verbal, from an employee not to join or become a member of any labor organization, as a condition of securing or continuing in employment.

Most of the trades-unions organizations in the United States were represented at a convention held at Columbus, O., in December, 1886, when a national organization was formed, a constitution adopted and the title taken of "The American Federation of Labor." This body and the Order of Knights of Labor of America are the two principal national labor organizations of the United States. Besides the encouragement and formation of trade- and labor-unions, and the establishment of national and international trade-unions, the objects of the American Federation of Labor are: to aid and assist the local unions; to secure national legislation in the interest of the working people, and to influence public opinion by peaceful and legal methods in favor of organized labor. For this purpose the American Federation of Labor aids and encourages the labor press of this country, there being a large and constantly increasing number of labor publications in the United States. The present headquarters of this organization are at 21 Clinton Place, New York City, and its president is Samuel Gompers of New York. Some of the unions in the following list are not formally affiliated with the Federation of Labor, but all are united by virtue of a common polity, and are agreed in according the Federation the hegemony of the labor movement. (See table on following page.)

The "Central Labor Union" of New York consisting of delegates from each *bona fide* trade and labor-union of New York City, has the same objects with regard to the city unions as the American Federation of Labor has with regard to the unions of the country at large.

LABORDE, ALEXANDER LOUIS JOSEPH COMTE DE, a French archaeologist, born at Paris in 1774, died in 1842. After serving for some years in the Austrian army, he went, in 1800, to Spain to explore that country. He described his experiences in a magnificent work entitled *Voyage Pittoresque et Historique de l'Espagne*. Afterwards he published *Les Monuments de la France; Voyage Pittoresque en Autriche; and Versailles, Anciens et Modernes*. He participated in the revolution of 1830.

LABORDE, LEON EMMANUEL SIMON JOSEPH, COMTE DE, a French archaeologist, son of the preceding, born in Paris in 1807, died there in 1869. He was educated at Paris and Göttingen. He traveled in the East and published an account of his visit to Arabia in his *Voyage en Orient*. Afterwards he held several diplomatic positions. In 1846 he published *Les Anciens Monuments de Paris*. He was curator of the antiquities at the Louvre for some years, and after 1857 director of the archives of the Empire.

LABOUCHERE, HENRY, an English journalist, and M. P., born in 1831. He was educated at Eton. He entered the diplomatic service in 1854 through the influence of his uncle the late Lord Taunton, and was successively attaché at Washington, Munich, Stockholm, Frankfurt, St. Petersburg, Dresden, and Constantinople, and sat as member of Parliament for Windsor in 1865-66, for Middlesex in 1867-68, and for Northampton since 1880. Mr. Labouchere is an advanced Radical, and one of Mr. Gladstone's most energetic supporters. He edits and owns "Truth," and is part proprietor of the "Daily News."

LABOULAYE, EDOUARD RENÉ LÉFÈVRE (1811-1883), a French author. In 1842 he was admitted to the practice of law in Paris, and in 1849 became professor of comparative legislation in the College of France. In 1871 he was chosen to the national assembly for the department of the Seine, in 1875 became a life senator, and in 1876 was made administrator of the College of France. Among his works are *Political History of the United States* (1855); *The United States and France* (1862); *Paris en Amérique* (1863); and *Memoirs of Franklin* (1866). The sons of M. Laboulaye will give the library and manuscript lectures of their father, at the College of France, to Johns Hopkins University.

LABRADOR, a dependency of Newfoundland, and under the administrative supervision of the governor of that island. For general article on LABRADOR, see Britannica, Vol. XIV, p. 175. The latest official reports place the area at about 56,000 square miles, and the population at 4,211. Included in the population of Labrador were 609 Indians. The statistics of trade, and productions are reported in connection with those of Newfoundland. The governor of Newfoundland and Labrador receives a salary of \$12,500.

LACEBARK TREE (*Lagetta Lintearia*), a tree of the natural order *Thymelaeaceae*, a native of the West Indies. The inner bark of the tree has all the appearance of coarse lace.

LACHES, LACHE (from the French *lâche*, lax, indolent), a law term signifying negligence, or remissness in asserting or enforcing a right. Where a remedy is discretionary, and not compulsory, laches on the part of the person seeking to enforce the remedy will prejudice and sometimes defeat his case. In courts of equity the maxim is "Equity aids the vigilant, but not the indolent." Laches are only excused if the party is laboring under a legal disability, as insanity, coverture (*a feme covert*, or married woman, has no right to sue in her own name), infancy (if the party had not attained legal majority), imprisonment, and the like. No laches can be imputed to a State.

LACHINE, a town of Quebec, Canada, situated on a railroad, eight miles from Montreal, and connected by a bridge with Caughnawaga. A ship canal eight and one-half miles long extends hence to Montreal harbor to avoid the Lachine Rapids of the St. Lawrence. It is a favorite summer residence and a place of resort for pleasure-parties during the winter.

LACKAWANA, or LACKAWANNOCK, a river of Pennsylvania, rising in Susquehanna county, flowing southwest and entering the Susquehanna at Pittston. Its basin is a very productive coal region whence one-half the anthracite coal of the United States is obtained. Scranton and Carbonate, important mining cities, are the largest towns on the river.

LACLEDE, a post-village of Linn county, Mo., ninety-seven miles east of St. Joseph. It is a grain shipping point and is located in a coal region.

AMERICAN FEDERATION OF LABOR.

Trades Unions led by the American Federation of Labor.	Official Addresses.	No. of Local Unions.	Total Membership.
Journeyman Bakers' National Union.....	150 Nassau street, New York City.....	80	17,000
National Union of Barbers.....	1,418 Michigan street, Toledo, O.....	22	1,500
International Boatmen's Union.....	26 Albany street, New York City.....	22	1,500
International Brotherhood of Iron Shipbuilders.....	227 Spring street, New York City.....	30	8,000
Federation of Book-keepers.....	711 Parade street, Erie, Pa.....	30	2,000
Box Sawyers' and Nailers' Union.....	1,005 N. 14th street, St. Louis, Mo.....	30	1,500
Brewery Workmen National Union.....	171 Allen street, New York City.....	60	7,800
Druggists' Ware Glass-blowers' League, E.....	19 Third avenue, Brooklyn, N. Y.....	26	3,500
Druggists' Ware Glass-blowers' League, W.....	Michigan City, Ind., L. Arrington.....	35	4,500
Brotherhood of Railroad Brakemen.....	Galesburg, Ill., E. F. O'Shea.....	215	15,000
International Bricklayers' & Stonemasons' Union.....	Cohoes, N. Y.....	215	1,000
Brush-makers' International of America.....	33 North Elliott Pl, Brooklyn, N. Y.....	750	72,240
Brotherhood of Carpenters and Joiners of America.....	P. O. Box 884, Philadelphia, Pa.....	38	2,500
Amalgamated Society of Carpenters and Joiners.....	226 W. 20th street, N. Y.....	315	29,000
Cigar-makers' International Union.....	Fitch Institute, Buffalo, N. Y.....	315	1,000
Carriage and Wagon-makers' Union.....	3,135 Arapahoe street, Denver, Col.....	315	2,500
National Union of Coopers of the United States.....	Titusville, Pa.....	325	35,000
United Mine Workers of America.....	City Building, Columbus, O.....	245	10,000
Order of Railroad Conductors.....	Cedar Rapids, Ia.....	57	8,500
Amalgamated Society of Engineers.....	238 E. Twenty-first street, N. Y. City.....	401	29,000
Brotherhood of Locomotive Engineers.....	Cleveland, O.....	120	6,000
Brotherhood of Stationary Engineers.....	Cincinnati, O.....	..	1,800
Electrical Protective Union.....	68 Third avenue, Pittsburgh, Pa.....	240	21,000
Brotherhood of Locomotive Firemen.....	Terre Haute, Ind.....	40	400
Furniture Workers' Union of America.....	351 E. 2nd street, N. Y. City.....	40	7,000
Flint Glass-workers' Union of North America.....	16 Excelsior Block, Pittsburgh, Pa.....	94	9,000
Green Glass Pressers' Union.....	2,641 Salmon street, Philadelphia, Pa.....	15	3,000
Glass Packers' and Sorters' Protective Union.....	Millville, N. J., W. J. Dummett.....	11	1,500
Table Knife Grinders' National Union.....	Northampton, Mass.....	85	20,000
Granite-cutters' National Union.....	Barre, Vt.....	13	5,500
Hat-finishers' International Association of N. A.....	56 Pulaski street, Brooklyn, N. Y.....	12	3,500
Hat-makers' International Association of N. A.....	238 Snyder ave., Phila. Pa.....	212	1,000
Silk Hatters' Association.....	212 Broadway, New York City.....	..	2,000
Wool Hatters' Association.....	Matteawan, N. Y.....	5	1,000
Half-spinners' National Union of America.....	204 Frederic avenue, Baltimore, Md.....	20	2,000
Saddle and Harness-makers' National Federation of America.....	107 Chestnut street, Boston, Mass.....	..	5,000
Horsehoers' Association.....	367 E. Sixty-seventh st., N. Y. City.....	35	3,000
Horse-collar-makers' Union.....	918 Geiger street, Louisville, Ky.....	269	40,000
Iron-moulders' Union of North America.....	P. O. Box 388, Cincinnati, O.....	801	58,000
Amalgamated Association of Iron and Steel-workers.....	Pittsburgh, Pa.....	60	12,000
Building Laborers' and Hod-carriers' National Union.....	26 Colony street, Boston, Mass.....	140	10,000
National Association of Machinists.....	Baltimore, Md.....	55	15,000
Metal-workers' Union of North America.....	Philadelphia, Pa.....	64	10,000
Musicians' National League.....	Philadelphia, Pa.....	36	11,000
National Pattern-makers' League.....	1,314 N. Fulton av., Baltimore Md.....	180	14,000
Brotherhood of Painters and Decorators of America.....	New York City.....	67	6,000
Piano-makers' Union.....	Pittsburg, Pa.....	80	14,000
Operative Plasterers' International Union.....	Newark, N. J.....	294	7,000
Journeyman Plumbers' and Gasfitters' Union.....	Indianapolis, Ind.....	24	29,000
International Typographical Union.....	209 North street, New York City.....	28	1,400
German-American Typographers.....	Quincy, Mass.....	16	12,000
Quarrymen's National Union of America.....	276 Spring street, New York City.....	81	10,000
Sailors' and Firemen's International Amalgamated Union.....	Box 219, Lynn, Mass.....	75	10,000
Lasters' Protective Union.....	325 Washington st., Boston, Mass.....	13	1,100
Boot and Shoemakers' International Union.....	759 Tenth avenue, N. Y.....	9	9,000
National Federation of Silk workers.....	Box 143, Fall River, Mass.....	12	1,400
Mulespinners' Union.....	J. Dean, (Telegram Office), N. Y. O.....	107	7,000
Stereotypers' Union of New York and Vicinity.....	Box 2,360, St. Paul, Minn.....	6	400
Stone-cutters.....	15 Pacific avenue, Chicago, Ill.....	112	17,000
Switchmen's Mutual Aid Association.....	Whitman, Mass.....	70	800
Tuck-makers' Union.....	85 E. Seventh st., New York City.....	25	9,000
Journeyman Tailors' Union of America.....	219 W. Jefferson st., Louisville, Ky.....	9	8,000
Brotherhood of Telegraphers.....	Philadelphia, Pa.....	5	800
Textile-workers' Progressive Union of America.....	137 W. 100th street, New York City.....	15	..
Mosaic and Encaustic Tile-makers' National Union.....	800 Linden street, Camden, N. J.....	25	1,000
Elastic Web-weavers.....	30 Pitt street, New York City.....	..	..
Wood-carvers' Union.....	2,465 Arapahoe street, Denver, Col.....	..	..
Machine Wood-workers' International Union.....			
Total, 1889-90.....			692,940

LACON, a city, the county-seat of Marshall county, Ill., on the Illinois River and on a branch of the Chicago & Alton Railroad. It is a grain shipping point, contains a distillery, a saw-mill, and flour-mills. The Illinois River is navigable to this point for steamboats.

LACONIA, the county-seat of Belknap county, N. H., twelve miles north of Concord, on Winnepesaukee River. It has manufactories of hosiery, flannel and cars.

LACONIC. The Spartans, or Lacedæmonians, whose country was called Laconia, systematically endeavored to confine themselves to a sententious

brevery in speaking or writing; hence the term *laconic* has been applied to this style.

LACROIX, PAUL, a French writer, better known by his pen-name of P. L. Jacob, Bibliophile, born at Paris, Feb. 27, 1806, died there Oct. 16, 1884. He was educated at the College Bourbon, and while still at school began to prepare editions of the old French classics. It was in the field of the historical romance, however, that he won reputation as a writer. Besides actively assisting in more than one journalistic enterprise he wrote romances, plays, books on history, on manners and costumes, and on autobiography, and edited memoirs, biographies,

etc. His most valuable productions were a series of works on the habits, manners, customs, costumes, arts, sciences, and intellectual condition of France from the middle ages down to the nineteenth century. From 1855 Lacroix was custodian of the Arsenal library of Paris.

LA CROSSE, a city, the county-seat of La Crosse county, Wis., situated on the Mississippi River, opposite La Crescent, Minn. On the Black River, which flows into the Mississippi a little to the north of La Crosse, a great many logs are floated down and here converted into lumber. This makes the town an important lumber distributing center. Six railways center here. The city stands on a sandy tract and is spread over a large area. Large quantities of grain and other farm products are shipped by rail and river. The population was 14,505 in 1880, but amounted to 25,053 in 1890, showing an increase of 72 per cent. during the intervening decade. See Britannica, Vol. XIV, p. 195.

LACUNARS, or **LACUNARIA**, the panels or coffers of ceilings, and also of the soffits of cornices. They are much used in the ceilings of porticoes and similar structures, and are frequently ornamented with pateræ.

LA CYGNE, a post-village of Linn county, Kan., sixty-three miles south of Kansas City, on the Osage River. It has superior water-power.

LADANUM (Arab *ladun*), or **LABDANUM**, a curious, delicately scented resinous gum which exudes from certain kinds of *Cistus* growing in Crete, Cyprus, and parts of Asia Minor, used in fumigating, as incense, and for other similar purposes. In Cyprus at the present time the gum is collected from the beards of the goats that browse among the bushes, a custom mentioned by Herodotus.

LADY CHAPEL, a chapel in a Roman Catholic Church dedicated to the Virgin Mary ("Our Lady"), and usually placed eastwards from the altar when attached to cathedrals. Henry VII.'s chapel at Westminster was the lady chapel of that church.

LADY FERN (*Anthyrium filixfemina*), a beautiful fern with bipinnate fronds, common in moist woods. See Britannica, Vol. IX., p. 101.

LADY'S MANTLE (*Alechmillia*), an Old World genus of herbaceous plants, of the natural order *Rosaceæ*, sub-order *Sanguisorbeæ*. The Common Lady's Mantle (*A. vulgaris*), abundant throughout Great Britain, has a bitterish, astringent taste; it was formerly used in medicine as an astringent.

LADY'S SLIPPER, any orchid of the genus *Cypripedium*. The corolla has a large inflated lip which resembles a slipper. In America the most conspicuous wild lady's slippers are the larger yellow, *C. pubescens*; the smaller yellow, *C. parviflorum*; the showy *C. spectabile*; and the stemless *C. acaule*. The roots of the first yield an official remedy, regarded as a nervous stimulant and antispasmodic. *C. barbatum* is a native of Java. See Britannica, Vol. XVII, p. 818.

LA FARGE, JOHN, an American artist, born in 1835. He was first a draughtsman on wood, then a painter of flowers, landscapes and portraits, and then a decorator of church interiors and a mural painter on biblical themes. His most notable works in church decoration are the interiors of Trinity Church, Boston; of St. Thomas's; of the Church of the Incarnation, and of the Church of the Ascension, New York City; and of Trinity Church, Buffalo. Among his paintings are *New England Pasture Land*, *View over Newport*, *A Gray Day*, *A Snowy Day*, *The Triumph of Love*, *The Last Day of St. Paul*, *The Wolf Chaser*, and *Sleeping Beauty*.

LA FAYETTE or **CHAMBERS COURT HOUSE**, a town, the county-seat of Chambers county, Ala., situated

eighty-six miles northeast of Montgomery. It has a good cotton trade and contains a female college, churches, hotels, and a newspaper office.

LA FAYETTE, a city, the county-seat of Tippecanoe county, Ind., pleasantly situated on the Wabash River, sixty-three miles northwest of Indianapolis. The Wabash and Erie canal passes by this town, and five important railroads intersect it. Lafayette is the seat of Purdue University, a well-endorsed State institution of learning, giving special attention to industrial training and scientific agriculture. The town manufactures farming-implements, machinery, wagons, cooperage, railway cars, and does a good business in pork packing and the shipment of grain and other farm products. Population, in 1890, 16,407. See Britannica, Vol. XIV, p. 201.

LA FAYETTE COLLEGE. See COLLEGES, in these Revisions and Additions.

LA FITTE, JEAN (1780-1826), an American adventurer, who, with his brother Pierre, established, upon the Island of Barataria, a colony which carried on smuggling and a species of piracy. During the war of 1812 these brothers, with their band of buccaneers, became temporarily law-abiding and did good work for the United States Government.

LAGAN, MATTHEW D., of New Orleans, La., a manufacturer, born in County Derry, Ireland, June 20, 1829. He received a common school education; emigrated to the United States in 1843 and settled in New Orleans. He was elected a member of the common council of that city in 1867 and 1882, serving as president of the body during the latter year, and was a member of the Constitutional Convention of 1879. In politics he is a Democrat and was elected a Representative from the second congressional district of Louisiana to the 50th Congress. In 1890 he was elected from the same district to the 52d Congress.

LAGERSTROMIA, a genus of plants of the natural order *Lythariæ*, distinguished by winged seeds, and containing some of the noblest trees of tropical forests. *Lagerstromia Flos-Reginæ* or queen's flower is the Jarul of India, a magnificent tree with red wood, much used for boat building.

LAGOON, a species of lake formed by the overflowing of the sea or of rivers, or by the infiltration of their water, hence lagoons are sometimes divided into fluvial and marine. In some cases they are dried up in summer, in others they preserve throughout the whole year the character of stagnant marshy pools, and in others the sea reunites them to itself in winter, but is separated from them in summer by a bar of sand or shingle. See Britannica, Vol. XIV, p. 217.

LAGOSTOMINÆ, a sub-family of *Chinchillidæ*, whose only known species, the viscacha—*L. trichodactylus*, is a characteristic rodent of the Pampas of South America. It is distinguished by a rat-like form, but with a bushy tail, the lip cleft, the fore feet four-toed and the hind three-toed.

LAGOTIS or **LAGIDUM**, a genus of rodents of the family *Chinchillidæ*, with two species, *L. cuvieri* and *L. pallipes*, inhabiting the Andes of Chili, Bolivia and Peru. They have long ears, long bushy tail, and are about the size of a hare.

LAGRANGE, a city, the county-seat of Troup county, Ga., seventy-one miles southwest of Atlanta, on two lines of railroad. It contains a furniture factory, banks, churches and two female colleges. Population, 3,099.

LAGRANGE, a post-village, the county-seat of La Grange county, Ind., forty-five miles northwest of Fort Wayne, on the Grand Rapids & Indiana Railroad. It has high and normal schools, churches, foundry, bank, pump and carriage factories.

LAGRANGE, a town of Lewis county, Mo., on the Mississippi River, 175 miles north of St. Louis. It has considerable river trade, very large rolling-mills for turning out railroad-iron, flour and planing mills, tobacco factories, and is the seat of La Grange (Baptist) College.

LA GRANGE, a post-village, the county-seat of Fayette county, Texas, on the east bank of the Colorado River, thirty miles northeast of Columbus. Steamboats can ascend the river to the place.

LAGRIMOSO, or **LACRIMOSO**, an Italian term used in music, similar to *lamentoso*. The delivery should be heart-stirring, but free from mannerisms.

LAHIJAN, or **LAHAJAN**, an important trading town of Persia, in the province of Gilan, close to the southern shore of the Caspian Sea, thirty miles southeast of Reshd. Population, 15,000.

LAIS, probably the name of two Greek courtesans, celebrated for their extraordinary beauty. The elder is believed to have been born at Corinth, and flourished during the Peloponnesian War. The younger appears to have been born in Sicily, but came to Corinth when still a child. She sat as a model to the painter Apelles, and is said to have been stoned to death by some Thessalian women whom she had made jealous.

LAKE BUTLER, a post-village, the county-seat of Bradford county, Fla., situated eleven miles south of Olustee. It has grist and saw-mills.

LAKE CITY, a post-village, the county-seat of Columbia county, Fla., surrounded by beautiful lakes containing excellent fish. It is the seat of the State Agricultural College, and a Peabody School, and is a winter resort for invalids.

LAKE CITY, a post-village of Lake county, Minn., on beautiful Lake Pepin. It is a wheat market, and has manufactories of flour, plows, and wagons. It occupies a picturesque site on a small plain between the lake and the bluffs.

LAKE FOREST, a post-village of Lake county, Ill., twenty-eight miles northwest of Chicago, on Lake Michigan. It contains Lake Forest University, a female seminary, a boys' academy, churches and elegant residences. Picturesque ravines and bluffs diversify its site.

LAKE MÄLAR, one of the largest lakes in Sweden, studded with upwards of twelve hundred islands, mostly well wooded. Its east end is close by Stockholm, where its waters are poured into the Baltic Sea. The shores are adorned with castles, country-seats, and villas, including the royal palaces of Drottningholm and Gripesholm. See *Britannica*, Vol. XXII, pp. 736, 737.

LAKE OF THE THOUSAND ISLANDS, an expansion of the St. Lawrence, extending about forty miles below Lake Ontario. It contains the group called the Thousand Islands, some fifteen hundred rocky islets, the largest, Wolf Island, measuring twenty-one miles by seven.

LAKE VILLAGE, a post-village of Belknap county, N. H., on the outlet of Lake Winnipiseogee, twenty-seven miles north of Concord. It has railroad-shops, machine-shops, a foundry, and hosiery-mills.

LAKSHMI, or **SRI**, in Hindu mythology, the goddess of good fortune and beauty, the name of the consort of the god Vishnu. See *BRAHMANISM*, in *Britannica* Vol. IV, p. 208.

LAMAR, **LUCIUS QUINTUS CINCINNATUS**, an American statesman, born in 1825. In 1847 he was admitted to the Georgia bar, and in 1849 became adjunct professor of mathematics in the University of Mississippi, but resigned the following year. He then returned to the practice of law in Covington, Ga., and in 1853 was chosen to the legislature. In

1854 he settled in Mississippi, and from 1857 to 1860 was a member of Congress. During the civil war he fought with the Confederate army, and attained the rank of colonel. In 1866 he became professor of political economy in the University of Mississippi, and in 1872 was again elected to Congress. In 1874 he received a reelection, and in 1877 became a United States Senator. During President Cleveland's administration Mr. Lamar was Secretary of the Interior, and afterwards became an associate justice of the Supreme Court of the United States.

LA MARMORA, **ALFONSO TERRERO**, Marquis de, an Italian general and statesman, born at Turin, Nov. 17, 1804, died Jan. 5, 1878. He was educated at the military academy, entered the army in 1823 with the rank of lieutenant of artillery, subsequently visited almost every country in Europe for the purpose of military study, and became known as a zealous reformer of the army. He was decorated for distinguished services in the national war of 1848, and promoted general of brigade. In 1849 he entered the cabinet as Minister of War, withdrawing in 1855 to assume command of the Sardinian troops in the Crimea. At the close of the war he was invested with the Order of the Bath and the Grand Cross of the Legion of Honor, and re-entered the university in his former capacity. He took part in the war of 1859, by which Lombardy was acquired by Italy, was appointed commander-in-chief of the Italian army in 1861, and became prime-minister in 1864. He was minister to Paris in 1867, and was governor of Rome in 1870-71.

LAMBERTVILLE, a city and railroad junction of Hunterdon county, N. J., on the Delaware River, 14 miles above Trenton. It has excellent water-power, running cotton, paper, twine and spoke mills, and also a rubber-factory, foundry and railroad construction and repair shops.

LAMELLIROSTRES, an order of aquatic birds including the flamingoes (*Phoenicopterus*) and the geese, ducks, swans, etc., which belong to the *Anatidæ*. The name refers to the lamella, in the beak (*Lat. rostrum*). Each mandible of their bills has a series of lamella or tooth-like projections at its margin, those of the upper mandibles alternating with and fitting into those of the lower.

LAMOV, or **LOMOV**, two towns of Russia, in Penza, on the Lomov River. Nizhnee or Nijni Lamov ("New" or Lower), is 65 miles from Penza. Population 4,526. Verkhnee or Verkhni Lamov ("Old" or Upper), is 68 miles from Penza. Population, 8,414.

LAMMAS, or **LAMMAS DAY**, the first of August, the festival of the wheat harvest, or "loaf mass." It was customary to offer first fruits on that day in the form of loaves of bread. "Lammas lands" were lands tilled by individual occupiers until harvest or lammas time, and then thrown open as common pasture.

LAMPRIDIDÆ, a family of acanthopterous fishes, of which a single genus, *Lampris*, is known. The genus is represented by one species—*L. lunus*, the *opah*, found in the Atlantic and Mediterranean. See *OPAH*, *Britannica*, Vol. XVII, p. 777.

LAMP-SHELL, a brachiopod of the genus *Terebratulina* and allied genera, or a popular name for the whole class. The name refers to the shape of the shell, which at one end resembles an ancient lamp with the wick.

LANARK, a post-village of Carroll county, Ill., 21 miles southwest of Freeport. It contains a flour-mill, elevators and warehouses.

LANCASTER, a post-village, the county-seat of Garrard county, Ky., in the "blue grass" region. It has a tobacco factory, a wheat-fan factory and a high-school.

LANCASTER, a post-village, the county-seat of Coos county, N. H., on the Connecticut River. It has a paper-mill and several starch and saw-mills, hotels, churches, and is a popular summer resort.

LANCASTER, a city, the county-seat and railroad center of Fairfield county, Ohio, on the Hocking River and the Hocking Canal. It has a State reform farm for boys in the vicinity, a fine school-building and court-house, flour-mills, foundries and manufactories. Population, 8,297. See *Britannica*, Vol. XIV, p. 255.

LANCASTER, a city, the county-seat of Lancaster county, Pa., near Conestoga Creek, on the main line of the Pennsylvania Railroad. Its streets are straight and cross each other at right angles. Among its institutions of learning are Franklin and Marshall College and a theological seminary, both under the control of the Reformed Church. Lancaster has a large trade in coal, tobacco and lumber. Among its manufacturing establishments are several cotton-mills, breweries, tanneries, potteries, paper-mills and machine-shops, several iron-foundries and blast-furnaces. It is the oldest inland town in the State. Population, 32,090. See *Britannica*, Vol. XIV, p. 255.

LANCASTER, a city, the county-seat of Grant county, Wis., 20 miles north of Dubuque, situated in a fine agricultural and lead ore region. It

contains a sash and door factory and a woolen-mill.

LANCASTER HERALD, one of the six heralds of England, ranking second in point of seniority. His office is said to have been instituted by Edward III, when he created his son, John of Gaunt, Duke of Lancaster.

LANCASTER GUN, a species of rifle cannon, which was named after its inventor and which had a bore of oval section. It failed during the Crimean war and was superseded.

LANCASTER SOUND, a western outlet of Baffin Bay, in 74° 21' N. lat., connected with Boothia Gulf on the south by means of Prince Regent Inlet. See *Britannica*, Vol. XIV, p. 257.

LAND. See **PUBLIC LANDS** in these Revisions and **Additions**, and **HOMESTEAD** in *Britannica*, Vol. XII, p. 122.

LANDERNEAU, a small seaport of France, at the head of the harbor of Brest, twelve miles from that town. It has linen manufactories, tanneries, candle-works, and carries on ship-building. Population, 8,003.

LANDGRAVE, a title of distinction borne by certain counts of Thuringia and Hesse, in the former German empire, who claimed the rank of princes of the empire.

LANDLORD AND TENANT. See *Britannica*, Vol. XIV, pp. 272-278.

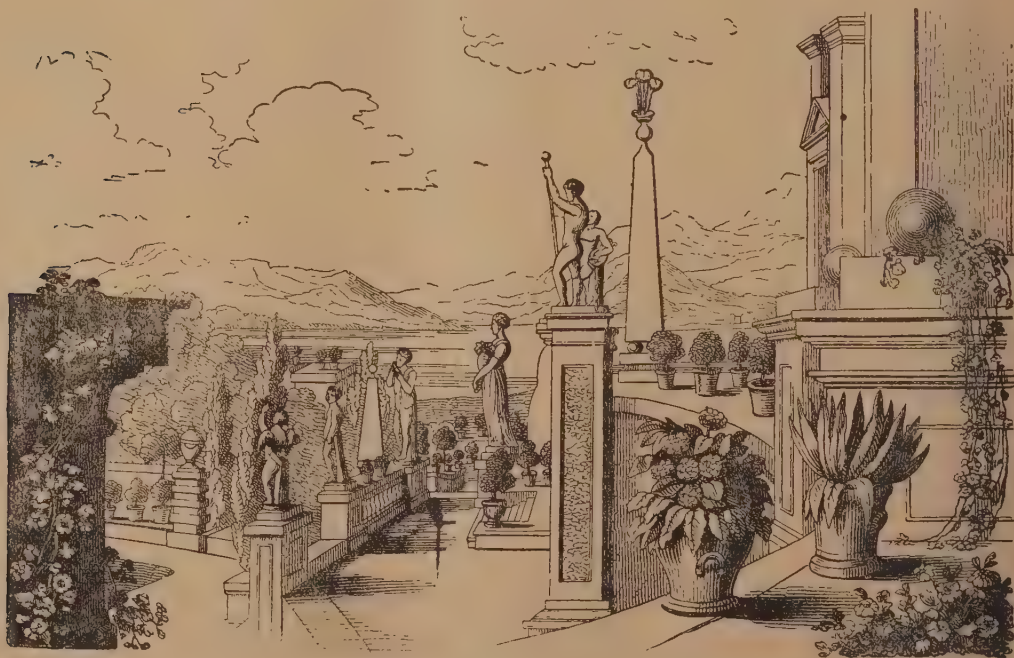


Fig. 1.—ISOLA BELLA, IN LAGO MAGGIORE.

LANDSCAPE-GARDENING

LANDSCAPE-GARDENING is the improving of grounds by laying off various pleasant walks, bordering them suitably, and covering the remaining surfaces with living plants which produce, under skillful cultivation, the impression of natural growth, and give the grounds the appearance of a beautiful natural landscape. When dwellings are surrounded by extensive grounds, and the owners have wealth and refined tastes, they will try to beautify the grounds by laying them off skillfully into walks, flower beds, patches of shrubbery, groups of small and large trees, greensward, ponds, lakes, and rivulets, utilizing slopes and levels, natural sources of water, and taking advantage of all the opportunities presented by nature for adornment and producing pleasing effects. The first requisite is the laying off of walks and drives. The second necessity is the providing of spaces for grass, flower beds, hedges, bushes, and trees. Next come the pools, ponds, brooks, and lakes, which must have proper outlets and inlets. The rockwork along lake-shore, brooks, and in forest patches, comes last. If this is introduced artificially the hand of art must be carefully concealed and the

The art of landscape-gardening obtained its first great impetus in the construction of the "Hanging Gardens" of Nineveh and Babylon, which gardens we know were built on lofty terraces. The Greeks and Romans, especially the Romans, spent a great deal upon their gardens, which, from Pliny's descriptions, must have been very tastefully arranged. After the fall of the Roman Empire the art of landscape-gardening declined, with all the other arts, but it revived again in the 17th century, mainly through the taste of Cardinal D'Est, whose celebrated gardens were made on the site of those of the emperor Adrian, and adorned with the discovered vases, statues and other ornaments of the imperial pleasure grounds. "Balustraded terraces of masonry; magnificent flights of steps; arcades and architectural grottos; lofty clipped hedges, with niches and recesses, enriched with sculpture, were the components of the ITALIAN style of gardening." This style is shown in Figure 1, which represents the gardens of *Isola Bella*. A barren rock, without an inch of earth on it, was by *Vitaliano Borromeo*, in 1671, converted into a paradise of fertility and luxury by bringing earth from the banks of the *Lago Maggiore* to one of the *Borromeo Islands* (see *Britannica*, Vol. IV, p. 64). He built ten terraces on arches, one above the other to the top of the island *Isola Bella*, on which the palace stands. These terraces he covered with fine exotic and native flowering plants, and with groves of bay, lemon and orange trees, interspersing statuary in rich abundance.

At Monza, near Milan, Italy, the royal residence has the finest garden scenery in Italy. The park, shown in ground plan in Figure 2, contains 3,000 acres of gently varied, fertile land. It is chiefly laid out in the regular style; but contains also an extensive and beautiful English garden. The culinary, flower, botanic and fruit gardens, orangeries

work made to appear natural and in harmony with its surroundings. Small cascades and other falling waters add greatly to the beauty of a landscape. They should not be omitted.

After the laying off of the grounds, the walks and drives must be constructed of material hard enough to stand the intended use; the grass-plots must be prepared, sowed with the proper seed, and the growing grass must frequently be cropped off in order to obtain a thick, velvety greensward, a natural carpet for the lawn. The border plants, fringes of shrubbery, and hedges are to be attended to next. The flowering-plants are then raised in their intended beds and by their appropriate methods. The bushes and shrubs are planted single and in groups, as it may appear most suitable for the particular spots. The large trees should nowhere be thickly crowded together, except where their shading effect is the object desired. Large trees are usually best interspersed with smaller trees. In all this work the main point is to retain the interesting features of the landscape, and to preserve and improve every natural characteristic of the site.



Fig. 2.

and hot-houses are all good and well managed. The river Lambro (b) passes through the grounds and adds greatly to their picturesqueness and usefulness, since it serves to irrigate them. The palace (c) is a very large building; d is the town of Monza. The double avenue (e) to Milan is bordered by tulip trees, magnolias, melias, robinias and other flowering trees, interspersed with evergreen and American oaks, and has a very beautiful effect.

The Italian style of gardening made its way with some rapidity over Europe, with the revival of art. But it was quickly altered by the French and Dutch to accord better with the character of their climates and more level countries.

Gardening was first brought to a high degree of perfection in Holland. The wealth acquired by the Dutch merchants and seafarers enabled them to indulge in fine country residences and luxurious gardens. They imported flowering plants, seeds and bulbs from the foreign countries they visited. The most cultivated Dutch flowers, as the tulip, anemone, hyacinth, narcissus, etc., are all Oriental, and came to them mostly from Constantinople in the sixteenth century. Bulbous flowers were extensively cultivated in Holland because the climate

and soil of that country are singularly favorable for their cultivation. The Dutch and the French landscape-gardening are characterized by symmetry and an abundance of ornaments. But the gardens of Holland are more confined than the French, more covered with frivolous ornaments, and more intersected with still waters. As a specimen of the Dutch style of the seventeenth century

we represent in Figure 3 the gardens and palace at Loo during the time of William III. The gardens, to compensate him for which the Hampton Court gardens in England were laid out, are a work of magnificence and great variety, yet with geometrical symmetry of design. The palace (*a*) ranks with the finest in Europe. It has a broad green walk in front with a double row of oaks a half mile

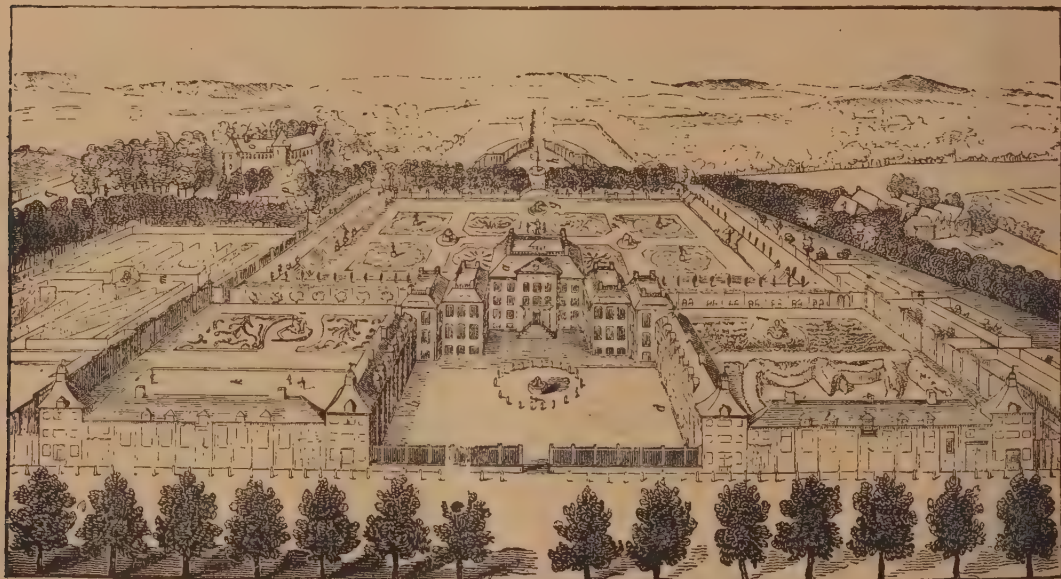


Fig. 3—PALACE AND GARDENS AT LOO, HOLLAND.

in length; *b* and *c* are stables and coach-houses; *d*, domestic office; *e*, orangery; *f*, fountain; *g*, lower garden; *h*, upper garden; *i*, the king's garden, with a large fountain; *l*, the queen's garden; *m*, the king's labyrinth of clipped hedges; *n*, the queen's labyrinth or wilderness with fountains, statues,

walks, etc.; *o*, the old castle; *p*, the fowl garden; and *q*, the park, containing a fountain and diverse long green walks, nurseries of young trees, groves, and canals, besides six fish ponds on different levels, the water flowing from the first through all the others. This picture of a Dutch palace and garden

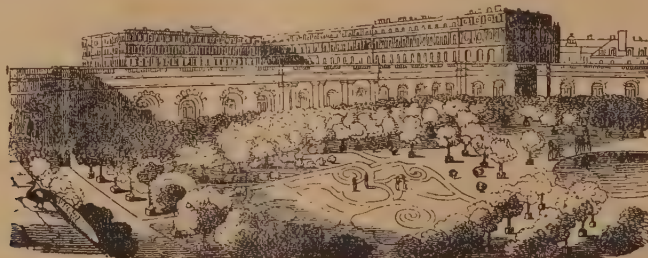


Fig. 4—VERSAILLES.

is not presented as worthy of imitation in the present age; but to show the historical development of landscape-gardening, as it is one of the most magnificent specimens of its time.

FRENCH gardening revived with André le Nôtre, who lived at the time of Louis XIV. He delighted in long clipped alleys, triumphal arches, richly decorated parterres, fountains and cascades, with grotesque ornaments, a profusion of statues and

thermes, and many deep grottos. All these wonders, springing up in a desert-like open country, dazzled and enchanted the beholders and caused the king to make him director of the royal gardens, to create him a knight, and to commission him with the improvement of the gardens of the Tuilleries, the Champs Elysées, Trianon, Neudon, St. Cloud, Chantilly, and the celebrated Terrace of St. Germain. England, Sweden and all Europe

adopted Le Nôtre's manner. The gardens of Versailles are the grand effort of Le Nôtre and the model of excellence in the geometrical school of landscape-gardening. In Figure 4 we give a representation of these gardens, showing numerous orange trees which are set out in favorable weather, some of these trees being as much as 30

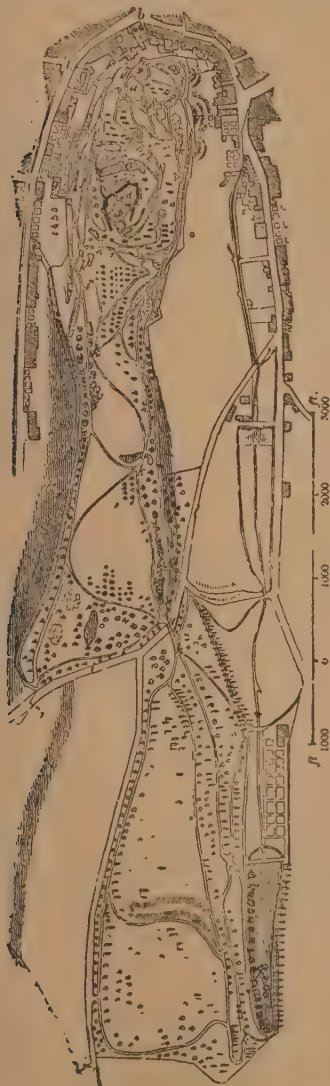


Fig. 5—GARDENS AT EPINAL.

feet high. The English poet Gray was struck with the splendor of these gardens when filled with company, and when the water-works were in full action; and the German physician, G. A. Agricola said: "When I reflect on Versailles and what I have seen there, I think I had a foretaste of paradise."

The modern ENGLISH STYLE of landscape-gardening was created by Bridgeman and Kent. William Kent especially vindicated the natural style against the artificial, and rejected entirely the mathematical symmetry of ground-plan then in vogue for laying out gardens. (See Britannica, Vol. XIV, p. 40). "Nature, not art, must be the model of the landscape-gardener," he said. The straight lines and stiff terraces of the ancient style were succeeded by flowing lines and wide smooth lawns and slopes; the formal avenues and geometrical clumps in which trees had been arranged were succeeded by pleasing curves and an irregularity of grouping that relieved the eye and beautified the scene. This idea made its way but slowly, especially since Kent insisted on doing away with the walls for boundaries and their replacement by light fences. Kent was a landscape painter; walls around parks and gardens were an abomination in his eyes. This style was gradually introduced in France as well as England.

The gardens and pleasure grounds of M. Doublat at Epinal, have the reputation of being the finest specimen of English gardening in France. Their great merits depend more on the natural beauties of the situation and of the surrounding scenery than on the exercise of any style of art. M. Doublat's grounds are shown in Figure 5. They consist of a rocky hill (*a*), rising abruptly from the town of Epinal to the height of 400 feet, and stretching away to the east for a mile in the form of a narrow ridge, gradually declining till it terminates in the valley of the Moselle; *bb* is the town of Epinal. It embraces the hill on three sides. *c* is the mansion; *d* the ruins of the castle of Epinal, on a high rock; *e* the moat, filled with water; *f* are broad terraced walls planted with fruit-trees and vines; *g* terraced kitchen-gardens; *i* is a public road which intersects the grounds; *kk* is the grand drive which crosses the public road on a bridge (*l*). On tracing this drive we find that it is very ingeniously contrived for going and returning over the same bridges, and also for combining the greatest length with the greatest variety of line.

The gardening of GERMANY, as compared with that of Great Britain, is, on the whole, inferior in the splendor of its productions; but it is nevertheless pursued in Germany with greater ardor in proportion to the wealth of the inhabitants. If there are no gardens in Germany in the natural style equal to the parks of Great Britain, it is not for want of skill on the part of the Germans in laying them out tastefully, but attributable more to the severity of their winters, the scarcity of good gravel for walks, and the economical closeness practiced in their country. Yet there are good botanic and pleasure gardens at Munich, Bavaria; at Ludwigsburg, Würtemberg; at Schwetzingen and Carlsruhe, Baden; at Wilhelmshöhe, Hessen-Cassel; at Berlin, Prussia, etc. The French style has prevailed in Germany from the earliest period. This is especially seen from Figures 6 and 7, which represent the garden or park in the center of Carlsruhe. Figure 7 is the palace (marked *a* in Figure 6). It is noted for having the wings at oblique angles with the main building. The circle (*b*) in Figure 6 is the promenade. In its center (*c*) is a tower which commands a fine view over the entire park. The whole place is a natural forest of pines and oaks, pierced with thirty-two avenues, all radiating from the central tower; *d* are flower and kitchen-gardens; *e*, the town, which has greatly increased in size since the park was laid out (the present extent of the city of Carlsruhe can be seen in Britannica, Vol. V, p. 112, together with the recent alterations in the Schlossgarten). In the

parterres of the park there are now many open lawns, varied by groups of trees. A great many exotics, especially evergreens, have lately been

introduced along the alleys and walks. Here the hemlock spruce, Norway spruce, silver fir, Weymouth pine and arbor vitæ have an admirable

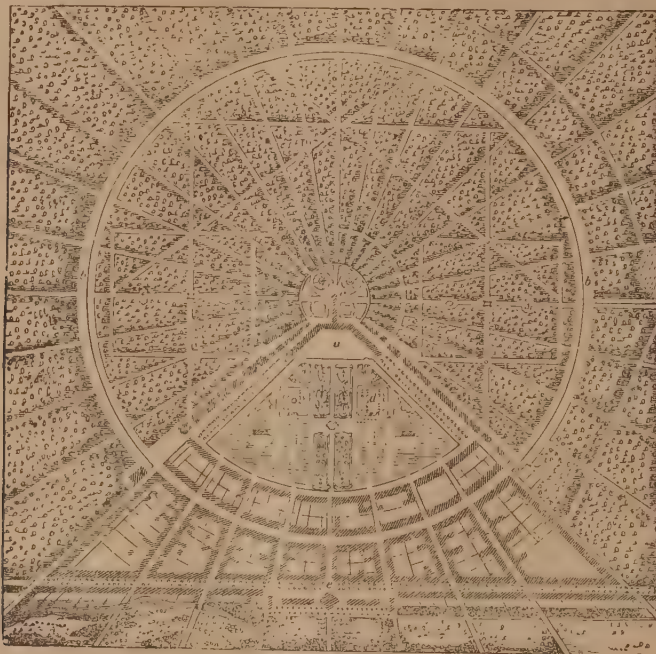


Fig. 6—CARLSRUHE GARDENS.

effect. Except in front of the palace, there are few grades of turf; there is consequently very little mowing and no clipping of hedges needed. These

grounds, which are at all times open to the public, are rendered the more agreeable during the summer season by a good band of music which peram-

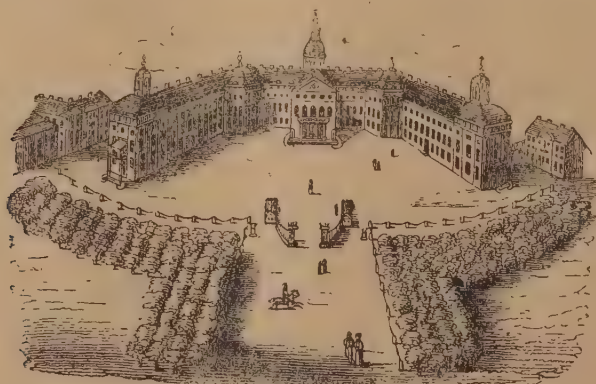


Fig. 7—CARLSRUHE PALACE.

bulates the grounds and is heard, with short intervals, from morning till night.

The Germans have now ceased to follow the French style of landscape-gardening. This is shown in Figure 8, which gives a plan view of the botanic garden in Berlin, Prussia. It resembles

the natural English style much more than the geometrical symmetry of the French. The letters in the figure have the following meaning: *a*, entrance; *b*, offices and lodgings for workmen; *c*, *d*, *e*, *f*, *h*, *i*, *k*, hot-houses for small and for large plants; *l*, *m*, *n*, greenhouses and conservatories; *o*, hot-beds for

raising seeds; *p*, structure for twining plants; *q*, compost ground; *rr*, places for under-shrubs, hardy perennials and biennials; *s*, place for annuals; *t*, place for water and bog plants; *u*, place for setting

tem of botany. This specimen is supposed to be 171 years old. Linnaeus called it *Phoenix dactylifera*; but this mistake was afterwards corrected.

In AMERICA the art of landscape-gardening has as yet made rather slow progress. But the increase of wealth since the close of our civil war, and the accompanying development of the artistic taste in painting, sculpture and allied branches, have given an impetus to this art which promises to bring it very soon to the level with the best works in Europe. Some cemeteries and the public parks of our cities have up to this time been the main fields for its exercise. The climate and other conditions of America will modify the art to some extent. Yet we hope, and have reason to expect from the laying out of the Central Park (see PARKS in these Revisions and Additions) and of the several other parks in the cities of New York, Brooklyn, Philadelphia, Chicago, etc., that the natural English style, with its gentle flowing lines, will ultimately predominate over the stiff, geometrical Dutch and French styles of landscape-gardening in this country.

LANDSTURM, in Germany, Austria, etc., that part of the reserve force consisting of men who do not belong either to the standing army, the navy, or the Landwehr. It is called out and organized to the extent required when the country is threatened by a hostile invasion.

LANE, JAMES HENRY (1814-1866), an American politician, born at Lawrenceburg, Ind., in 1814. In 1840 he was admitted to the bar, and in 1846 he enlisted in an Indiana regiment, of which he was soon made colonel. At the battle of Buena Vista Lane commanded a brigade. In 1848 he was elected lieutenant-governor of Indiana. From 1853 till 1855 he was a representative in Congress, having been chosen as a Democrat. There he voted for the Kansas-Nebraska bill, that is, for the repeal of the Missouri compromise. After moving to Kansas, in 1855, Lane took an active part in the formation of the State government there. He was the leader of the Free-soil party. As such he presided over both the Topeka and the Leavenworth constitutional conventions. The free-state forces elected him major-general, as he was most active in driving out the "border ruffians." In 1858 he shot a neighbor dead in a quarrel about a well. He was tried for murder, but acquitted of the charge. When Kansas was admitted as a State of the Union, Lane was elected United States Senator. He served on the committees of Indian affairs and agriculture. During the civil war he was for a time brigadier-general of volunteers. In 1865 he was reelected for the United States Senate. But in the following year, when on his way home, he had an attack of paralysis, and committed suicide at Leavenworth on July 11, 1866.

LANESBOROUGH, a town of Fillmore county, Minn., 50 miles southwest of La Crosse, Wis. It contains a newspaper office, churches, a bank, a high-school and various manufactories.

LANG, ANDREW, an English writer, born at Selkirk in 1844, and educated at Edinburgh Academy, St. Andrews University and Balliol College, Oxford, where he graduated first-class in classics. Engaging in literature, he soon became known as one of the busiest as well as one of the brightest writers in the world of London journalism. His *Ballades in Blue China* (1881), brought him into prominent notice, and his subsequent works, especially *Helen of Troy*, *Rhymes à la mode and Custom*, *Ritual and Myth*, increased his reputation. He is joint translator with Professor Brichtner of the *Odyssey*, and with Mr. Myers and Mr. Leaf of the *Iliad*. Mr. Lang was in 1888 appointed Giffard

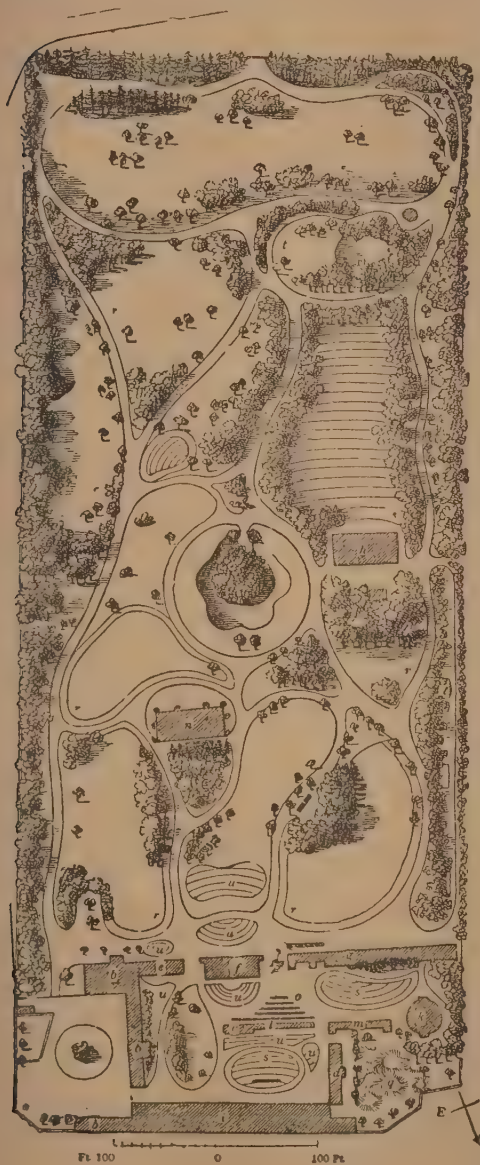


Fig. 8—BOTANIC GARDENS IN BERLIN.

out the greenhouse plants during summer; *v*, road from Berlin to Potsdam. This garden contains a specimen of the fan-palm, *camerops humilis*, 18 feet high, which was the subject of the experiment cited by Linnaeus as a proof of his sexual sys-

Lecturer on natural religion at St. Andrews University. His recent works include *The Gold of Fairmiles*, *Lost Leaders* and *Prince Prigio*; he has also edited the *Blue Fairy Tale Book* and the *Red Fairy Tale Book*. In 1890 he wrote, in collaboration with Mr. Rider Haggard, *The World's Desire*.

LANG, JOHN DUNMORE, an Australian clergyman and statesman, born at Greenock, Scotland, in 1799, died at Sidney, Australia, in 1878. After being ordained by the Presbytery of Irvine, Lang went to Australia in 1823 as the first minister of the Church of Scotland. There he was repeatedly elected to the legislative assembly, and assisted in securing the independence of Victoria and Queensland from New South Wales. He also worked for the union of the Presbyterian churches in Australia, and was active in founding the Australian Presbyterian College, of which he was made principal. Lang published *The History of New South Wales* (1834), and similar works on the other Australian colonies.

LANGDON, JOHN, an American statesman, born at Portsmouth, N. H., in 1739, died there in 1819. He engaged in mercantile business there till 1774, when he secured the ordnance stores of Fort William and Mary in Portsmouth harbor for the colonists. In 1775 he was elected to the Continental Congress, and in 1776 he became a navy agent. In 1777, while he was speaker of the New Hampshire assembly, and means were needed for equipping Gen. Stark's brigade, Langdon gave all his money, pledged his silver plate, and subscribed the proceeds of 70 hogsheads of tobacco for that purpose. He commanded a company in the brigade and took part in the battle of Stillwater. In 1779 he presided in the New Hampshire convention, and in 1787 he was a delegate to the convention at Philadelphia which framed the constitution of the United States. In 1788 he became governor of New Hampshire, and in the next year he was elected United States Senator, holding office till 1801, when he was chosen president of the Senate. From 1805 till 1812, with the exception of one year, Langdon was governor of New Hampshire.

LANGÉ, JOHANN PETER, a German theologian, born at Sonnborn, near Elberfeld, in 1802, died at Bonn in 1884. After studying theology at the University of Bonn, he became pastor in several German places until 1841, when he was called to Zürich as professor of church history and dogmatics. In 1854 he was made professor of theology at Bonn, and in 1860 he became counsellor of the consistory. His great *Bibelwerk*, a commentary on the Bible, has given him extensive and deserved fame. Lange's other theological works comprise *Das Leben Jesu*, a refutation of Strauss; *Die Christliche Dogmatik*, and *Das Apostolische Zeitalter*.

LANGEVIN, SIR HECTOR LOUIS, a Canadian statesman, born at Quebec in 1826. After studying law he was admitted to the Canadian bar in 1850, and became a Queen's counsel in 1864. For one term he was mayor of Quebec, but for several terms he served as representative in the Dominion Parliament. From 1864 till 1865 he was solicitor-general for Lower Canada, and from 1865 till 1867 he was postmaster-general. In the last-named year he became secretary of state for Canada, which portfolio he retained until he was appointed minister of public works in 1869. In 1878 he became postmaster-general again, and in the next year again minister of public works. Langevin is a Conservative in politics. He wrote *Le Canada, ses institutions*, and *Droit administratif, ou manuel des paroisses et fabriques*; also *Report on British Columbia* (1872).

LANGHOLM, a market-town of Dumfriesshire, Scotland, at the junction of the Ewes and Wau-

chope Waters with the Esk, 23 miles south-south-west of Hawick, and 22 miles north of Carlisle. In 1890 Thomas Hope, a New York merchant and native of Langholm, left \$400,000 to found a hospital here. On the site of the town the Douglasses were defeated in the battle of Arkinholm (1455). Population in 1881, 4,209.

LANGSTON, JOHN MERCER, an American lawyer and educator, born in Louisa county, Va., in 1829. By birth he was a slave, but was emancipated in childhood. He studied theology at Oberlin in 1853, and afterwards he studied law. From 1854 till 1869 he practiced law in Ohio. In 1869 he was made professor of law in Howard University, Washington. In 1873 he became dean of the faculty of the law department of the university. From 1877 till 1885 Langston was United States minister and consul-general in Hayti. After his return to this country he was appointed president of the normal and collegiate institute in Petersburg. He is the author of a volume of selected addresses entitled *Freedom and Citizenship* (1883), and has published many papers on political, biographical, literary and scientific subjects.

LANGUAGES. The number of spoken languages in the world is estimated at a little more than 1,000. The number of written languages is much smaller. The British and Foreign Bible Society and the American Bible Society up to Jan. 1, 1891, had printed and circulated the Bible, or portions thereof, in 291 different languages and dialects. Samples of 213 of these are printed on pages 263-278 of Vol. I of these Revisions and Additions. For general article on LANGUAGES, see PHILOLOGY, in *Britannica*, Vol. XVIII, pp. 765-790.

LANIER, SIDNEY, an American poet, born at Macon, Ga., in 1842, died at Lynn, N. C., in 1881. He graduated at Oglethorpe College, Midway, Ga., in 1860. In the next year he enlisted in the Confederate service, and took part in the seven days' fighting near Richmond. In 1863, while in command of a blockade-runner, Lanier was captured and for five months was kept imprisoned at Point Lookout, Fla. This experience he afterward pictured in a novel entitled *Tiger Lilies*. After being clerk, school-teacher and lawyer in turn, he settled in Baltimore in 1877, and delivered lectures on English literature. In 1879 he was appointed lecturer on this subject in Johns Hopkins University. Of his many writings we mention *Science of English Verse*; *Florida, its Scenery, Climate and History*; *Poems*; *The Boy's King Arthur*; *The Boy's Froissart*; *The Boy's Percy*, and *The English Novel and the Principle of Its Development* (1883). He was scholarly, accurate, and presented the metrical technicalities in a novel form.

LANKAVATARA, one of the religious works of the Buddhists, which treats of their religious law and of some of their most abstruse philosophical problems.

LANKESTER, EDWIN, an English physician, born at Melton, in Leicestershire, in 1814, died in 1874. After studying medicine at University College, London, and at Heidelberg, where he graduated in 1839, he became professor and lecturer in various schools in London. He published *Vegetable Physiology*, *School Manual of Health* and various other medical works for popular use.

LANKESTER, EDWIN RAY, an English physicist, born at London in 1847. After being educated at Christ Church, Oxford, he first became lecturer in Exeter College, Oxford, in 1872, and then professor of zoölogy and comparative anatomy in University College, London, in 1874. By prosecuting the spirit-medium Slade in 1876 he compelled him to leave England. Beside his work as editor of the "*Quar-*

terly Journal of Microscopical Science," and as secretary of the British Association for the Advancement of Science, Professor Lankester found time to publish *Fossil Fishes of the Old Red Sandstone*; *Comparative Longevity*, and *Developmental History of the Mollusca* (1875). He is prominent in the defense of scientific vivisection.

LANMAN, CHARLES, an American author, born at Monroe, Mich., in 1819. After he had been clerk for ten years in New York business houses, he returned to Michigan and took charge of the "Monroe Gazette" in 1845. In 1849 he became librarian of the war department at Washington; in 1866 he was librarian of the House of Representatives, and from 1871 till 1882 secretary of the Japanese legation. He also practiced landscape painting as an amateur. Among Mr. Lanman's published writings we mention *Essays for Summer Hours*; *Letters of a Landscape Painter*; *A Summer in the Wilderness*; *Private Life of Daniel Webster* (Lanman had been Webster's private secretary for some time); *Dictionary of Congress* (this work was published by order of Congress); *Resources of America* (this book was compiled for the Japanese government); *The Japanese of America*; *Leading Men of Japan*; *Curious Characters and Pleasant Places*, and *Haphazard Personalities*.

LANNION, a town in the French department of Cotes-du-Nord, on the Guer, which is navigable for sea-going ships to this point, 69 miles from Brest. Population 5,893.

LANSING, a city of Allamakee county, Iowa, on the Mississippi River, 81 miles north of Dubuque. It has a furniture factory, flour-mill, agricultural implement factory, and is a great grain depot.

LANSING, the capital of Michigan. Population in 1890, 12,630. See Britannica, Vol. XIV, p. 290.

LANSINGBURG, a village in Rensselaer county, N. Y. Population, 10,523. See Britannica, Vol. XIV, p. 291.

LANTANA, a genus of plants of the natural order Verbenaceae. The species, of which some 40 or 50 are known, are chiefly natives of tropical or sub-tropical America. They are mostly low shrubs, with opposite toothed leaves, and heads of smallish variously colored flowers. A number of the species are cultivated as greenhouse plants, notably *L. Camara*, *L. mixta* and *L. nivea*. *L. pseudo-thea* is highly esteemed in Brazil as a substitute for tea. Four species are found in the United States, chiefly in the southwest.

LA PAZ DE AYACUCHO, a city of Bolivia, and the capital of the department of La Paz. It is a great commercial city, has an extensive foreign trade, contains fourteen churches, besides a beautiful cathedral, is well built and has a healthful climate. It is situated on the river Chuquapo, has schools of medicine, law, theology and science, and has often been the seat of the government.

LAPEER, a city, the county-seat of Lapeer county, Mich., 64 miles northwest of Detroit. It has large mills and is a shipping point for shingles and pine lumber. Population, 2,795.

LAPHAM, INCREASE ALLEN, an American geologist, born at Palmyra, N. Y., in 1811, died at Oconomowoc, Wis., in 1875. He was first a stone-cutter, then he worked on several canals as a civil engineer. In 1836 he settled at Milwaukee, Wis., where he was made register of claims. He prepared an herbarium of some 8,000 specimens of plants found in Wisconsin, also a catalogue of shells. He studied especially the grasses of Wisconsin; then the geology of that State, and lastly the fluctuations in the level of Lake Michigan. In 1873 he became State geologist. Besides numerous contributions

to scientific periodicals he published *Wisconsin: Its Geography, Topography, History, Geology and Mineralogy*; *Geological Map of Wisconsin*, and *Antiquities of Wisconsin*. The latter was published by the Smithsonian Institution in 1855.

LA PLATA, the capital of the Argentine province of Buenos Ayres, founded in 1882, after Buenos Ayres city, from which it is about 30 miles southeast, had been made the federal capital. The new city was rapidly built, with wide streets that are now mostly paved; the central portion is lighted with electric light, the rest with kerosene lamps. The only buildings of note are the handsome capitol and other offices of the Government, an observatory, several chapels and a fine railway station. The city has a college, and several miles away, a hospital and an asylum for the insane. Among the manufactories already established is one of cotton and woolen tissues. A canal connects a harbor, which has been constructed at La Plata with a large outer harbor at Ensenada, on the La Plata river. Population (1888) of municipality (including Ensenada and a country district of nearly 60 square miles), 50,803.

LA PORTE, a city of Indiana, county-seat of La Porte county. Population, 7,122. See Britannica, Vol. XIV, p. 308.

LA PORTE CITY, a post-village of Black Hawk county, Iowa, on Wolf Creek, one mile from Cedar River and 16 miles southeast of Waterloo. Flour, wagons, carriages and other articles are manufactured here.

LAPSED (*Lapsi*), the designation applied in the early Christian church to those who, overcome by heathen persecution, did not continue faithful to the Christian religion. The lapsed were at first punished by excommunication and their reception into the church again was strenuously resisted, but in the 3d century a milder course was generally adopted with regard to them. The treatment of the lapsed was one of the practical questions most earnestly discussed in the early church.

LARAMIE, a river which rises in northern Colorado, flows generally northeast through southeastern Wyoming and enters the North Fork of the Platte at Fort Laramie, after a course of about 200 miles. It is much used for floating lumber from the mountains.

LARAMIE CITY, the county-seat of Albany county, Wyo., situated in the midst of Laramie Plains, 7,122 feet above sea-level, and 57 miles by rail from Cheyenne. The first female jury ever empaneled served here.

LARAMIE MOUNTAINS, a range of Colorado and Wyoming, but mostly in Wyoming. These mountains extend southward in a curve, bounding Laramie Plains on the northeast and east. Laramie Peak, in Albany county, Wyo., is their highest point.

LARAMIE PLAINS, a treeless plateau of Wyoming, about 7,500 feet above sea-level, and some 3,000 square miles in extent, inclosed on all sides by high mountains. The soil is alluvial, and produces good pasture, and beds of iron and coal of good quality have been found. The Union Pacific Railroad crosses the southern part of this plain, which is partly irrigated by the Laramie River.

LARCH, a coniferous tree. See Britannica, Vol. XIV, pp. 309-312; in the United States, Vol. XXIII, p. 809; Culture of, Vol. II, p. 315.

LARD, hog-fat. See Britannica, Vols. XIV, p. 312, XVII, p. 74; Adulteration of, Vol. I, p. 171.

LARGESSE, money which in early times it was the practice to grant to heralds, on certain state occasions, for proclaiming the style and title of the sovereign and his nobles.

LARGO, an Italian word used in music, to denote very slow time, and especially in compositions where the sentiment is quite solemn. *Larghetto* is the diminutive of *Largo*, the time being slightly quicker.

LARINÆ, a sub-family of *Laridæ*, having the beak well developed, with hooked upper mandible projecting downward in front of the lower, and the tail usually square and of moderate length; the gulls. The leading genera are *Larus*, *Pagophila*, *Rissa*, *Rhodostethia* and *Xema*. See GULL, *Britannica*, Vol. XI, p. 274.

LARK, a bird. See *Britannica*, Vol. XIV, p. 314.

LARNED, a city, the county-seat of Pawnee county, Kan., situated on Arkansas River and on the Atchison, Topeka & Santa Fe Railroad.

LAROUSSE, PIERRE, a French publisher, born at Toucy, in Yonne, in 1817, died in 1875. After he had been a teacher for some years, he commenced, in 1851, the publication of school-books, many of which he prepared himself. The principal work whose publication he undertook was the *Dictionnaire Universel du XIXe Siècle*, for which he commenced to engage contributors in 1863. The exhaustive labor connected with the undertaking hastened his death, which occurred when the dictionary was only half finished. It was completed in 16 volumes by his widow, and proved a great success.

LARREY, BARON DOMINIQUE JEAN, a French surgeon, born in 1766, died at Lyons in 1842. After studying at Toulouse and Paris he became a surgeon of the French army in 1792, and eventually surgeon-in-chief, serving in Egypt, Germany, Spain and Russia. Larrey was wounded and captured at Waterloo. Napoleon bequeathed to him 100,000 francs. He invented the *ambulance volante*, and made numerous improvements in clinical and operative surgery.

LARREY, BARON FÉLIX HIPPOLYTE, a French surgeon, son of the preceding, born at Paris in 1808. He was professor of pathology at Val-de-Grâce, surgeon to Napoleon III, and chief surgeon of the army in Italy in 1859. He has published valuable reports and memoirs.

LA SALLE, a city of La Salle county, Ill., situated on the north bank of the Illinois River. It is the western terminus of the Illinois Canal, which extends to Chicago, and is on the Illinois Central & Chicago, Rock Island & Pacific railroads. The country around this place is very fertile. La Salle is engaged in the manufacture of glass, in the mining of bituminous coal, and in the smelting and rolling of zinc. The town has a park and is lighted with gas and electricity. Population in 1890, 9,904. See *Britannica*, Vol. XIV, p. 318.

LASKER, EDUARD (1829-1884), a German statesman, born at Jarocin, Posen, in 1829, of Jewish parentage. After studying law at Berlin and in England, he became in 1856 an assessor in the city court of Berlin. In the Prussian chamber of deputies, to which he was elected in 1865, he assisted in founding the national liberal party, and assisted Bismarck in measures tending to the unification of Germany, but in the Reichstag, of which he became a member in 1870, he opposed Bismarck's measures in regard to government control of the railroads, and showed himself a determined advocate of free trade when the chancellor adopted the protective policy. The struggle for leadership between Lasker and Bismarck became bitter and personal. In 1883 Lasker made a visit to his brother in Texas, and while returning, he died suddenly in New York City, Jan. 5, 1884. The United States House of Representatives passed resolutions of regard and transmitted them to Germany by the United States

government, but Prince Bismarck returned them as containing improper reflections on the internal affairs of the German Empire.

LAST TESTAMENT, or **WILL**, the last instrument in point of date, and it revokes prior wills so far as they are inconsistent.

LAS VEGAS, a post-village and county-seat of San Miguel county, N. M., on the Pecos River, 70 miles east of Santa Fe. The Las Vegas Hot Springs are northwest of this village.

LATEEN-SAIL, a large triangular sail common in the Mediterranean.

LATHAM, ROBERT GORDON, an English philologist and ethnologist, born at Billingsborough, in Lincolnshire, in 1812, died in 1888. After studying medicine he became assistant physician in the Middlesex hospital. Then he traveled in Norway and studied the Scandinavian idioms. In 1840 he was made professor of English literature in University College, London. He published *Norway and the Norwegians*; *Treatise on the English Language*; *Natural History of the Varieties of Mankind*, including *Man and His Migrations*; *Ethnology of Europe*, and *Nationalities of Europe* (1863). Latham also edited *Johnson's English Dictionary* (1870).

LATIN CHURCH, the Roman Catholic or Western Church as distinguished from the Greek Catholic of the West were called Latins because from early times down to the Reformation they everywhere used Latin as their official language.

LATIN CROSS, a cross with the lower limb considerably longer than the other three limbs.

LATIN EMPIRE, the name given to that portion of the Byzantine empire which was seized in 1204 by the Crusaders who made Constantinople their capital. It was overthrown by the Greeks in 1261.

LATITUDINARIANS: in church history, a name applied by contemporaries to a school of theologians within the English church in the latter half the 17th century. They strove to unite the dissenters with the Church by insisting only on those doctrines which were held by both. The school was represented by a succession of well-known Cambridge divines, who attempted to construct a philosophy of religion at once free and conservative, in which the rights of faith and the claims of speculative intellect each have free scope.

LATHROBE, a post-borough of Westmoreland county, Pa., forty-one miles east of Pittsburgh, on the Loyalhanna Creek, at the junction of the Pennsylvania and the Ligonier Valley railroads. It contains a convent and St. Vincent's College, has large coke and coal companies, and manufactories of paper, flour and machinery.

LATROBE, BENJAMIN HENRY, an American architect, born in Yorkshire, England, in 1764, died at New Orleans, La., in 1820. After being educated in a Moravian Seminary in Saxony and at the University of Leipzig he served in the Prussian army as a cornet of Hussars and was twice wounded in severe actions. Having resigned his commission he returned to England, became an architect, and in 1789 was made surveyor of the public offices in London. In 1796 he came to the United States. Latrobe was engineer of the James River and Appomattox Canal, built the penitentiary in Richmond, the Bank of Pennsylvania in Philadelphia, the Schuylkill water works (1800), which supply Philadelphia with water, the Roman Catholic cathedral in Baltimore, etc. He completed the capitol at Washington in 1811, and after it was burned by the British in 1814 he was called to rebuild it. In 1812 he became interested with Fulton in steamboating on the Western waters, and built the "Buffalo" at Pittsburgh, the fourth steamer that descended the

Ohio River. At the time of his death Latrobe was engaged in erecting works to supply New Orleans with water.

LATROBE, BENJAMIN HENRY, an American engineer, son of the preceding, born at Philadelphia in 1807, died at Baltimore in 1878. After studying law, and becoming a barrister, he soon abandoned the profession and became an engineer of the Baltimore & Ohio Railroad, assisting in locating its Washington branch and other divisions. In 1842 Latrobe became the chief-engineer of this road, and as such he completed it from Harper's Ferry, across the Alleghenies to Wheeling. He also built other roads, was consulting engineer of the Hoosac tunnel, and one of the advisory board to whom John A. Roebling submitted his plans of the Brooklyn bridge.

LATTEN (Fr. *laton*, "brass"), a term specially applied to sheet-brass but also used of sheet-tin, tinned iron-plate, and any metal in tin sheets, as gold latten.

LATTICE LEAF, also called *Lace Leaf*, (*Ouvirandra fenestralis*), an aquatic plant of the natural order *Juncaginæ*. The plant is a native of Madagascar, growing on the margin of running streams. The leaves, in radiating clusters, float immediately under the surface of the shallow water. Their peculiar lattice-like structure is due to the absence of the cellular tissue which fills the space between the nerves and veins of ordinary leaves. The flower stems rise to the surface of the water and there divide into two spikes of flowers. The yam-like root is edible. See *Britannica*, Vol. XV, p. 170.

LATUDE, HENRI MASERS DE, a French prisoner of State, born at Montagnac, in Languedoc, March 23, 1725, died Jan. 1, 1805. A young artillery officer, he sought to make himself conspicuous by revealing to Madame de Pompadour a plot to poison her. The plot was discovered to be of his own contriving, and he was sent to the Bastille in 1749. In spite of ingenious efforts to escape, he remained in prison till 1777, when he was released on condition of living in his native village. But having come to Paris again, he was imprisoned till 1784. When the Revolution broke out the case was brought before the public and used as a means of exciting hatred against the old régime. In 1793 a court awarded him 60,000 livres in damages to be paid by the heirs of Madame de Pompadour.

LAUNITZ, ROBERT EBERHARD, an American sculptor, born at Riga, Russia, in 1806, died at New York in 1870. After studying under Thorwaldsen at Rome, Italy, he settled in New York in 1828, and became the first instructor of Thomas Crawford. He was made a member of the National Academy in 1833. Launitz executed the Battle monument at Frankfort, Ky.; the Pulaski monument at Savannah, Ga.; the monument to Gen. G. A. Thomas, at Troy, N. Y., and other similar works, many of which are in Greenwood cemetery, Brooklyn. Launitz has been called the father of monumental art in America.

LAURACEÆ, a natural order of exogenous plants, consisting of trees or shrubs, divided by modern authors into four tribes, the *Perseaceæ*, *Listeaceæ*, *Cassytheæ*, and *Hernandiezæ*. The order contains about nine hundred species, mostly tropical. An aromatic and fragrant character pervades the order, and amongst its products are cassia, cinnamon, camphor, and many valuable drugs and timber-woods. The sassafras, bay, and a few other shrubs and trees of the United States are lauraceous.

LAUREL, AMERICAN, a genus of plants, see **KALMITA** in these Revisions and Additions.

LAURENTIAN MOUNTAINS, the principal range of British America, extending from Labra-

dor to the Arctic Ocean, a distance of about thirty-five hundred miles. It forms the watershed between Hudson Bay, the St. Lawrence, and the great lakes, and between the same bay and the Mackenzie River. The general elevation of the Laurentian range is from 1,500 to 1,600 feet; some peaks about the Saguenay attain a height of 4,000 feet. The fundamental series of rocks, called the Laurentian system by Sir William Logan, is of extremely remote geologic era.

LAURIUM, a range of hills forming the south-east portion of Attica, Greece, famous in ancient times for rich mines of silver, lead and zinc. The mines at one time were supposed to be exhausted and were deserted. Since 1863 however, the scoræ and refuse ore have been worked with profit, and the mines themselves have been reopened. They are connected with the port of Ergasteria by a railway seven miles long.

LAVAL—MONTMORENCY, FRANÇOIS XAVIER DE, first Canadian Roman Catholic bishop, born at Laval, France, in 1623, died at Quebec in 1708. He studied at the College of La Flèche, and received the tonsure at the age of nine. Being heir to the title and estates of his family, he resigned all his rights in favor of a younger brother. After finishing his theological studies at Paris he was ordained in 1646. In 1657 the king nominated him for the see of Quebec, but his consecration was delayed till 1658. His title was vicar apostolic of Quebec and bishop of *Petræa in partibus*. He reached New France in 1659, organized parishes there and relieved the Jesuits of their charges as pastors of parishes. In 1662 he returned to France to obtain missionaries and means for his diocese. Coming back to Canada in the next year he set about building a large church at Quebec, and founding a "grand séminaire" for the education of priests, and a "petit séminaire" as a preparatory college. In 1670 the vicariate of Quebec was erected into a titular bishopric, and Laval returned to France in 1672 to obtain the bulls of consecration. Having come back as bishop of Quebec in 1675, he laid the foundation of the Seminary of the Holy Family, which was to take the place of the two seminaries he had founded before, and gave all his property for its support. In 1688 he resigned the administration of his diocese and retired to the seminary he had erected. Laval was a man of pure, upright and devoted character. His name is commemorated in Laval University at Quebec. The Roman Catholic Church in Canada has petitioned the pope for his canonization.

LAVER, a name given to several kinds of seaweed used as food, especially *Porphyre vulgaris* and *P. laciniata* (sometimes called Sloke) of the subgroup *Florideæ*, or red sea-weeds. They consist of a very thin purple frond, which is not gelatinous. Laver is regarded as useful in scrofulous affections and glandular tumors, a property which it probably owes to iodine.

LAVELEYE, ÉMILE LOUIS VICTOR DE, a Belgian economist, born at Bruges in 1822. After studying law at Ghent he devoted himself to economical studies, and has been since 1858 a regular contributor to the *Revue des Deux Mondes*. In 1864 he was made professor of political economy in the University of Liège (Löttich). Laveleye has published *Mémoire sur la langue et la Littérature Provençales; Histoire des Rois francs; L'Enseignement obligatoire; La Question d'Or; Les Formes du Gouvernement dans les Sociétés Modernes; De la Propriété et ses Formes Primitives; Le Protestantisme et le Catholicisme; L'Afrique centrale, and L'Italie actuelle* (1881). In politics he is a moderate liberal, and in political economy a moderate protectionist.

LAW

BY the term "law" we understand here the body of rules and regulations laid down by the authorities of a State for governing its citizens, administering justice, preserving social order and advancing the general good. A law must be enforced by the physical power of the State, else it becomes useless, or even a mockery. It is therefore evident that no "civil law" can exist without a "civil government" capable of enforcing it. "Civil society" is the consorting of men together, not under voluntary rules, but under an organized government capable of exercising the power to enforce the code of compulsory laws laid down by the ruling power of the State. Without such laws and a strong government behind them civil society could not exist. A "voluntary society" would incontinently drop to pieces, because the excitement of passion, the instincts of selfishness and greed and the blindness of judgment where our own interests are at stake, would result in anarchy and the success of the stronger against the weaker. Men and women are no angels under the present dispensation. They have not the laws in their hearts when their interests are at variance with the general good.

The laws of a State may be prescribed by an autocrat, or by a legislative body, or by the mass of the citizens in general assembly, or they may have arisen from custom and usage, or from the decrees of the courts of justice; in all cases they are only *de facto* laws when the physical power of the State is put forth for their vindication and enforcement. When, during turbulent, revolutionary excitement, the power of the State is paralyzed and unable to enforce the laws, then we have a state of lawlessness, of anarchy; brute force rules. Civil society is then broken to pieces. Then we realize that the laws, together with their proper enforcement, are the bonds which hold civil society together; that social happiness, industrial progress and personal advancement depend on properly executed civil and criminal laws. Without laws there would be no security. If crime should go unpunished, the criminal class would have full sway, the weak would be at the mercy of the strong, life and property would have no value. Law is the basis of all civilization, of refinement, of decency, of education, of science and intelligence, of the arts, the amenities and embellishments of society. Without laws we should have barbarism, even savagism, and all the pleasant things on which our happiness hinges would become impossible.

When we move among our fellow-men we are hardly aware of the omnipotent influence of the law. We see order, quiet, peace; the uninterrupted pursuit of peoples, trades and occupations; services are rendered willingly and even cheerfully; in business transactions trust is reposed by one man in another; all work out the constant evolution of human happiness. What causes this orderly onward movement? It is the law; the ever-present consciousness of its requirements, of its equity, of its justness and of its power. The law is in, over, under and behind every human action. It governs and controls every movement, although we hardly perceive it. We feel its protection when we deliver goods to a man in exchange for a slip of paper acknowledging the receipt of the goods; when we render services to another, sometimes very hard and even dangerous services, and go to our homes in the evening without even having seen the party for whom we have exerted our strength during the

day. We feel its protection when we entrust our earnings to a savings-bank, or when we draw a bill of credit and start with it on an European tour. We feel the law's ever-present watchfulness when we lie down to sleep in rooms whose locks and keys may be picked with the greatest ease by any burglar and robber. It is the all-powerful law that makes us feel secure in the possession of our lands and tenements after we have received and recorded a deed for the same. In ordinary conduct conformity to the law's rules and requirements is pursued as a second nature. Only one business transaction out of a million requires the arbitration of a court.

Law is therefore not an abstract and dead idea, to be unearthed by students, attorneys and judges; it is a living force, ever active in restraining, regulating and moulding society, and in stamping its form and spirit upon every business transaction. In studying the law of a country we study the form, the spirit, the tendencies, the pursuits and characteristics of society in that country, and *vice versa*, these various aspects of its society give us considerable knowledge of a country's laws. It is therefore of great importance that no hasty and inconsiderate legislation should take place, and that every bill should be discussed and weighed in all its bearings before it is made a law of the land. For this the constitutions of the United States and of the several States make ample provision. We have in our federal government the House of Representatives, which represents the people as individuals, and the Senate, which represents the several States as communities. Every bill is discussed in both houses. When both concur in a measure there is still the President, who can veto, and thereby annul it, unless it is re-enacted by a two-thirds vote in both houses. In the several States the governor has the veto power. This bi-cameral system of law-making, combined with the presidential or gubernatorial concurrence required for each law, is calculated to produce only wise and beneficial laws, if any human agency can produce them.

In law-making there are three fundamental principles to be followed: (1) every law must be founded on reason, justice and good morals; (2) every wrong must be redressed by giving to the injured party a proper remedy against the wrongdoer, and (3) when a question of right and wrong has once been solemnly decided by the highest judges of the State, the rules of that decision must be followed in similar cases subsequently occurring. The "common law" has been developed in England under these fundamental principles, and was afterwards introduced into our own country, where it has lately grown to quite noble proportions. But the common law is not adequate to all exigencies of our advanced state of society. We need laws for the establishment of territorial and municipal jurisdiction; for the establishment of tribunals for the administration of the laws, and of institutions for promoting the general good and maintaining public order; laws which define crimes, misdemeanors and other offenses, and mete out the proper punishment for them; laws for the proceedings in courts, in the transaction of business, in the administration of estates, and laws for the thousand other things that cannot be foreseen nor foretold.

To decide how far the written laws shall extend is, of course, a matter of legislative discretion.

Some legislators want to make written laws for every legal phase that may turn up, and abrogate the common law altogether; others again want to limit the written law to those matters which require positive regulation, and leave all other subjects to the plastic rules of the common law. In this case large room for the exercise of reason and judgment must be left to the tribunals. Their decisions will add to the written code; and, in the course of time, the accumulation of adjudicated decisions, growing out of the actual exigencies of society, will furnish better rules for the guidance of courts and the people than any *a priori* compilation of rules could possibly furnish. These "precedents" constitute the "jurisprudence of the state;" they are the larger part of the common law of the country. They are based upon reason and justice as applied to actual occurrences in recent years. For this reason they are the most valuable guides in similar cases. Although they were not enacted by any legislative body, the decisions of the highest State and United States courts are "laws" of the land to all intents and purposes. And it is well that they are laws, because they are the image of the country's progress; the application of the legal idea to new industrial and social methods of doing things.

A fruitful source of law is custom and usage. A custom is based on the temper, genius and habits of a people. It will be relied on in business transactions, and can afterwards not be conveniently deviated from. It thus becomes the "practical law" of the land, and the courts will decide cases in conformity with it. The jurisprudence arising from this source is also part of the common law.

Still another source of law is the adoption by new States of the entire code of laws of some older State. Thus, in Louisiana, a civil code was adopted in 1808, based on the Spanish and French laws which had previously prevailed in the colony; and in 1825 it was revised and made to conform more closely with the civil code of France, called the *Code Napoleon*. But when this code fails to furnish a rule applicable to a case in hand, resort is always had to the civil law as taught by the French schools of jurisprudence, which is really a great fountain of common law.

From the nature and origin of laws it appears that they are the natural outgrowths of a nation's development, like its language and industry. They express the nation's "sense of justice," as the language expresses its thought. In the Middle Ages law was distributed and held upon the tenure of military service, and was made to descend to the eldest son as the person most capable of performing the service required. This was at that time just, as well as expedient. Since laws are founded upon the immutable principles of justice and right, they cannot be arbitrary rules laid down according to a legislator's whims. The study of law or jurisprudence is therefore a real science, and is essentially the same in all civilized countries.

Law is generally divided into *written* and *unwritten law*. The former is formulated in precise and fixed terms, is committed to writing or print and promulgated as the absolute law of the realm. It includes all the statutes enacted by the legislative bodies, as our Congress and State legislatures, and the ordinances of the county and municipal councils acting within the scope of their several jurisdictions. *Unwritten law* is the common law, including the decisions of the highest courts, and that part of the law which has grown up from custom and usage. According to the subjects which the law covers there are several different branches of the law. *Public law* treats on matters of public

concern; such as the form of government and the political divisions of the State, the assignment of powers to the subdivisions of the government, the establishment of public institutions, of administrative boards and of courts of justice, the provisions for the punishment of crimes and misdemeanors, and for the execution of the laws in general. *Private laws* relate to the vindication of private rights; as those concerning men's persons, reputations, liberties, estates and the redress of private wrongs inflicted by one individual upon another.

In the department of public law there are several distinct branches of law, independent of one another. These are International Law, Constitutional Law, Administrative Law and Criminal Law. On INTERNATIONAL LAW, see Britannica, Vol. XIII, p. 190, and in these Revisions and Additions the article INTERNATIONAL LAW, PRIVATE. On CONSTITUTIONAL LAW, see Britannica, Vol. VI, p. 309. On CRIMINAL LAW, see Britannica, Vol. VI, pp. 586-590, and Vol. IX, p. 124 (FEUERBACH).

ADMINISTRATIVE LAW is that branch which provides for the establishment of those public institutions and works that are created or carried on for the benefit and protection of society, such as armies, navies, fortresses, light-houses, harbors, piers, bridges, high-ways, railroads, canals, mails, prisons, hospitals, poor-houses, asylums, universities and other schools, and benevolent corporations. All of them have a beneficent action, and advance civilization. See Britannica, Vol. XIV, pp. 354-370.

LAWES, SIR JOHN BENNETT, an English agricultural experimenter, born at Rothamsted, near St. Albans, Herts, in 1814. After studying chemistry in London, and inheriting his father's estate, he began in 1834 to experiment upon the best methods of raising farm crops and the useful effects of fertilizers. In this work he had the assistance of the eminent chemist Dr. J. H. Gilbert, who became associated with Mr. Lawes in 1843. The results of these experiments have been published in a series of reports and papers, which are everywhere acknowledged as being of the highest value. Messrs. Lawes and Gilbert have also made experiments on the best feed for live stock, on drainage, and sewerage, in animal and vegetable physiology, and in various other departments of rural economy. Mr. Lawes was made a baronet in 1883. He has endowed his agricultural station with £100,000.

LAWN (from the Old English word *launde*, land), a grass-plot situated near a mansion or dwelling. It is mostly situated in front of the house; but large lawns are sometimes at the sides or in the rear. In the country, large lawns look best if they are sloping and undulating. In cities, lawns are generally small and level. In making a lawn, we have first to see to the grading of the plot, and to cover it with good soil, not too rich in manure. The soil must be well raked and pulverized, and then good grass seed sown on it, and the plot often sprinkled afterwards. If the ground is heavy and damp, we must drain it with porous tiles. To obtain a fine, velvety lawn, it is necessary to roll the plot, and when the grass grows up, we must clip it frequently. The clipping is done by means of a *lawn mower*. But in small city plots it is oftener done by means of sickles or grass-hooks. They do very well in such cases.

The quickest way of getting a small front lawn is by cutting good turf about two inches thick and transplanting it to the plot. If it is well irrigated and not walked over, the turf will soon unite with the soil. It is cheaper than preparing the soil and buying the seed sold for "lawn grass," which is a

mixture of various kinds of grass-seeds, the odorous vernal-grass being often an ingredient.

LAWN-SPRINKLER, a contrivance for sprinkling a lawn or garden gently and evenly. The most common form consists of an upright pipe supported on a stand, and having an attachment for a hose at the lower end and a swivel-collar at its top. From the swivel-collar project several short branches with small perforations, near the ends, all of which turn in the same cyclical direction with respect to the center. When the water is turned on, its escape from these holes causes the swivel-collar to revolve in a horizontal plane, and the escaping water is made to spread in drops over a circular portion of the grass-plot. The swivel-collar is caused to rotate by the pressure of the rapid streams of water against the air.

LAWRENCE, JOHN, an American statesman, born in Cornwall, England, in 1750, died at New York in 1810. After removing to America in 1767 he was admitted to the bar of New York in 1772, became aide-de-camp to Gen. Washington in 1777, and presided in the same year as judge-advocate-general at the trial of Major John André. In 1784 Lawrence was elected to Congress; in 1794 he was made United States judge for the New York district; and two years later he was elected to the United States Senate, over which he presided in 1798. He was an ardent patriot, and the personal friend of Washington and Hamilton.

LAWRENCE, a city, the county-seat of Douglas county, Kansas, on the south bank of the Kansas River. It lies on the Union Pacific, the Atchison, Topeka & Santa Fé, and the Southern Kansas railroads, and is also the terminus of two branch railway lines. The city is the center of trade for a fertile and populous section of the State, having a favorable situation between Topeka and Kansas City, Mo. The Kansas River affords here a good water-power, utilized by means of a dam. The manufactures are therefore in a thriving condition, the most important of them being flour, woodenware, castings, furniture, and carriages. This city is the seat of the Kansas State University, a large and prosperous school which occupies a commanding site on Mount Oread. Population in 1890, 9,975. See *Britannica*, Vol. XIV, p. 370.

LAWRENCE, a city in Essex county, Mass., situated on both banks of the Merrimac River, but principally on the north side. It is twenty-six miles north of Boston. At this point the Merrimac River falls about 30 feet. Its water power is made available by a splendid granite dam nearly 1,000 feet long, and by canals, one on each side of the river. Its great natural advantages have given Lawrence its industrial importance. The town is connected with Boston by the Boston & Maine, and Boston & Lowell railroads, and with Manchester, N. H., by the Manchester & Lawrence Railroad. Branch railroads extend to Lowell and Salem. There are numerous cotton and woolen mills here, some of the largest in the world, besides establishments for the manufacture of machinery, boilers and steam-engines, boots and shoes, paper, and clothing. The high-school building is a costly and imposing edifice. The town is lighted by gas and electricity, and supplied with water from the Merrimac. Population, 44,654. See *Britannica*, Vol. XIV, p. 370.

LAWRENCE, ABBOTT, an American merchant, born at Groton, Mass., in 1792, died at Boston in 1855. At the age of fifteen he was bound an apprentice to his brother Amos, and in 1814 he became a partner in the firm of A. & A. Lawrence, which for many years conducted a prosperous business in the sale of foreign cotton and woolen goods on com-

mission. They were also the selling agents of the Lowell manufacturers. Abbot was an advocate of protection to American industries, and an earnest supporter of the Whig party. He served several terms in Congress. From 1849 to 1852 he served as United States minister to Great Britain; and performed afterwards an important service in the settlement of the fishery question, which threatened to lead to serious complications. He founded the Lawrence Scientific School of Harvard University, giving and bequeathing together \$100,000 for this purpose, left \$50,000 for the erection of model lodging houses, and established many prizes and scholarships in the public schools.

LAWRENCE, AMOS, an American merchant, born at Groton, Mass., in 1786, died at Boston in 1852. After clerking in a country store he became a dry-goods merchant in Boston in 1807. Seven years later he entered into partnership with his brother Abbot, who had been his chief clerk for the previous five years. The business operations of the firm were highly successful. In 1850 the brothers Lawrence established a cotton-mill at Lowell, Mass. After a serious illness Amos retired from the business in 1831, and devoted his life afterwards chiefly to deeds of charity, giving liberally to educational institutions. He established and maintained a child's infirmary in Boston and gave \$10,000 for the completion of the Bunker Hill monument. His public benefactions summed up to \$639,000.

LAWRENCE, GEORGE ALFRED, an English author, born in 1827, died in Sept. 1876. He was educated at Rugby and at Balliol College, Oxford, where he graduated with honors in 1848, and four years later was admitted to the bar. He was the author of *Guy Livingston, Sword and Gown*, *Barren Honor*, and several other popular novels.

LAWRENCE, JAMES, an American naval officer, born at Burlington, N. J., in 1781, died at sea in 1813. In 1802 he was made lieutenant and took part in the war with Tripoli, where he distinguished himself on several occasions. In 1811 he was promoted to a captaincy, and made commander of the United States gunboat *Hornet*. In a fight with the English brig-of-war *Peacock* off Demerara, Lawrence sank the latter after a fire of fifteen minutes. For this victory he received the thanks of Congress. In 1813, as commander of the frigate *Chesapeake*, Lawrence had an engagement near Boston with the British frigate *Shannon* under Capt. P. V. Broke. Lawrence was shot, and the *Chesapeake* was captured in spite of his dying cry: "Don't give up the ship!" on being carried below.

LAWRENCE, SIR WILLIAM, F. R. S., (1783-1867), an English surgeon. He became in 1815 one of the professors of anatomy to the Royal College of Surgeons, and in 1829 a lecturer on surgery to St. Bartholomew's. He was author of important works on *The Treatment of Hernia* (1807); *An Introduction to Comparative Anatomy and Physiology* (1819); and *A Treatise on the Venereal Diseases of the Eye* (1831).

LAWRENCEBURG, a city, the capital of Dearborn county, Ind., situated on the Ohio River, and on the Ohio & Mississippi, and Indianapolis, Cincinnati & Lafayette railroads, at the southern terminus of the Whitewater Canal, twenty-two miles below Cincinnati. It has a number of furniture manufactories. Population in 1890, 4,280.

LAWSON, SIR WILFRID, baronet, born at Brayton Hall, Cumberland, Sept. 4, 1829, and succeeded to the baronetcy on the death of his father in 1867. He became at an early age an enthusiastic advocate of the temperance movement, and returned in 1859 as member for Carlisle, lost his seat for that borough in consequence of the introduction into the

House of Commons of his "bill for the legislative suppression of the liquor traffic" in 1864. He was, however, again returned in 1868 for the same city, which he continuously represented till the general election of 1885. In the following year he was returned for the Cochermonth division of Cumberland. Sir Wilfrid Lawson is the leader of the United Kingdom Temperance Alliance, and its spokesman in the House of Commons, where, as in the provinces, he is very popular. He has thrice successfully proposed his local option resolution.

LAWYER. See **ATTORNEY** in these Revisions and Additions.

LAYARD, SIR AUSTEN HENRY, G. C. B., an English traveler and diplomatist, born in Paris, March 5, 1817, passed his boyhood in Italy, and commenced his active career as correspondent of a London paper at Constantinople. With the assistance of Sir S. Canning, in 1845, he began to make a series of discoveries of Assyrian antiquities, of which he gave an account in his well-known works *Nineveh and its Remains*, and *Monuments of Nineveh*. Mr. Layard subsequently abandoned oriental research for diplomacy. In 1852 he sat as member for Aylesbury, and in 1860 for Southwark; in 1861-66 he was under secretary of state for foreign affairs, and there after chief commissioner of works. He was appointed ambassador at Madrid, in 1869, and in 1877 was sent as plenipotentiary to that city. In 1887 he published his *Early Adventures in Persia, Babylonia, and Susiana*.

LAY DAYS, a term used in the law of shipping to denote a stipulated number of days allowed to a freighter or charterer of a vessel for shipping or unshipping cargo. In the absence of custom to the contrary, Sunday is included in the computation of lay days at the port of discharge.

LAZZARONI (Ital. *lazzaro*, "leper;") probably from their being outcasts or separate from other citizens), until lately a special class of the inhabitants of Naples. They had no fixed dwelling places or secure means of subsistence, but occasionally obtained employment as messengers, etc. They performed an important part in all the revolutions and movements in Naples, and annually elected a chief who was formally recognized by the government.

LEA, HENRY CHARLES, an American author, born at Philadelphia in 1825. At the age of 17 he entered the publishing house of his father, of which he afterwards became the principal. He has published several papers on chemistry and conchology, notably *Description of New Species of Shells*. During the civil war he organized a municipal system of bounties for recruits to encourage volunteering, and wrote much for periodicals. Since 1857 he has devoted special attention to mediæval history, and wrote *Superstition and Force; Essays on the Wager of Battle; The Wager of Law; The Ordeal and Torture; Historical Sketches of Sacerdotal Celibacy; Studies in Church History; The Rise of the Temporal Power; Benefit of Clergy; Excommunication; The Early Church and Slavery, and A History of the Inquisition of the Middle Ages* (1888).

LEA, ISAAC, an American naturalist, born at Wilmington, Del., in 1792, died at Philadelphia in 1886, of Quaker stock. His mother fostered his natural fondness for botany, and his friend Lardner Vanuxem encouraged his interest in mineralogy and geology. In 1815 he became a member of the Philadelphia Academy of Natural Sciences, and from 1853 to 1858 he was its president. Having married Matthew Carey's daughter he became in 1821 a partner in Carey's publishing house, and continued in the book publishing business until 1857. But he devoted his leisure hours to science. In 1827

Lea commenced the publication of a series of memoirs on fresh-water and land shells. His first paper was on the genus *Unio*. His specimens of this genus alone number 10,000. He read before the Philadelphia societies at least one hundred and fifty memoirs on natural history. Among his published writings we mention *Contributions to Geology; Fossil Footmarks; Observations on the Genus Unio* (1827-74). This last work forms thirteen quarto volumes magnificently illustrated. In 1884 he entertained the American Association of Science and their guests of the British Association at his residence at Long Branch. Lea bequeathed his valuable collection of fresh-water shells, land and marine shells, minerals, fossils, and geological specimens to the National Museum in Washington. Lea discovered the footprints of *Clepsysaurus Pennsylvanicus*, a large saurian, in the red sand stone of Pottsville, Pa., 700 feet below the conglomerate of the coal formation, and found subsequently many bones and teeth of this fossil animal. This discovery was of great interest, for the existence of an air-breathing animal as low as the coal measures had not at that time been definitely accepted.

LEAD, a metal, see *Britannica*, Vol. XIV, pp. 374-379; Vol. XVI, pp. 58, 382, 465; as a chemical element, Vol. V, p. 531; production of in the United States, Vol. XXIII, p. 817; in Missouri, Vol. XIV, p. 525; in England, Vol. VII, p. 228; in Spain, Vol. I, p. 593; Vol. XIV, p. 653; Vol. XXII, p. 301; spectrum of, Vol. XXII, p. 376; as a poison, Vol. VI, p. 140; Vol. XIX, p. 278.

The world's production of lead in 1890, is estimated at 460,000 tons, and that of the United States was according to the last census, 153,709 tons. The English product has lately decreased, while that of Germany, Spain, and the United States has been steadily increasing. On the subject of white carbonate lead, see **WHITE LEAD**, in these Revisions and Additions.

LEADVILLE, a mining town, the county-seat of Lake county, Colo., the second city in size and importance in the State. The city is situated near the Arkansas River, on California Gulch, just west of the Mesquite range, about seventy miles southwest of Denver City, in a straight line, but 150 miles by the Union Pacific Railroad, and 277 by the Denver & Rio Grande road. The town site is 10,200 feet above sea-level, and the mountains east, north, and west reach a height of 14,000 feet. The surrounding scenery is grand and imposing. Leadville is the leading silver-mining center of Colorado. It is surrounded by the richest mines furnishing carbonate-of-lead ores; but other silver-bearing ores are also abundant. Leadville has several smelting and ore-reduction works, also several stamp-mills, where gold-bearing quartz is comminuted and the precious metal is amalgamated. Placer claims were in California Gluch since 1860. The city of Leadville was incorporated in 1878. Its population in 1880 was 14,820, but in 1890 it was only 11,159. The decrease is accounted for by the removal of some of the large smelting works to Denver, Pueblo, and Colorado Springs. See *Britannica*, Vol. XIV, p. 379.

LEAF-INSECT, or WALKING-LEAF (*Phyllium*). a remarkable genus of orthopterous insects, of the family *Phasmide*, natives of the East Indian region. The abdomen is flattened out, and covered in the wingless females by a pair of wing-covers which together look like a green leaf; the legs are also flattened, green and leaf-like. The male has functional wings, but is also mimetic. As the insects live among leaves and are sluggish, their detailed resemblance to the surroundings cannot be usefully protective. See *Britannica*, Vol. XIII, p. 152; Vol. XVI, p. 343.

LEAF-ROLLER, the larva of any tortricid moth which makes a case for itself by rolling up the leaves of plants. The number of genera and species is great, and as a rule the insects are very destructive of useful vegetation. Common leaf-rollers of the United States are the strawberry leaf-roller, *Phoxoptiris Fragariae*, and the cotton or rose leaf-roller, *Lozozenia Gossypiana* or *Cacecia Rosaceana*. The latter works on the leaves of cotton, rose, clover, birch, apple, and many other trees and plants.

LEAPING-FISH (*Salarias Tridactylus*), a curious little fish of the Blenny family, abounding on the coast of Ceylon. It is very nimble, and by the aid of the pectoral and ventral fins and the gill-covers it moves across the damp sand, ascends the roots of mangroves, and runs up wet rocks in quest of flies. It is three or four inches long and of a dark brown color.

LEATHER (See Britannica, Vol. XIV, pp. 380-91). In America hemlock bark is mostly used for tanning sole and upper leathers. For making Morocco leather the leaves of the Sumach (*Rhus*) are employed; also tanning extracts, prepared from oak and hemlock barks mixed, for the so-called "union tannage." Knapp's process of tanning with ferric salts, and Dr. Heinzerling's method of quick tanning by means of chromates, with an addition of aluminium salts, chloride of sodium, etc., have received but little attention from practical tanners here, although making some progress in Germany. In Sweden an electric tanning process, invented by J. D. Abom has been successfully tried. Ox-hides suitable for sole-leather were hung into tanning liquor between two copper plates, which served as the electrodes. An alternating current from a Siemens' dynamo, having an electromotive force of fifty volts and a strength of one hundred amperes, was passed into these plates. The hides were completely tanned in from fifty to ninety hours, according to the strength of the tan-liquor employed. An electric tanning process of another inventor, who moves the hides mechanically during the operation of tanning, is said to make some progress in France. But we have no reliable statistics in either of these cases. Among tanners it is an accepted maxim that no time abridging process can produce good sole-leather, because for the thorough tanning of thick hides a slowly operating influence, and therefore a long time, is necessary.

The preparation of the skins for the reception of the tanning differs very little in the various methods of tanning. After cleaning the hides from adhering dirt, blood, etc., they are "soaked" in vats containing clear, cold water, for a time differing from three to ten days. After soaking, the hides are "softened" in a mill similar to the fulling-mills in woolen factories. This mill is called the "hide-mill." Calf and goat skins, however, are softened in a revolving drum, termed a "pin-mill," because its interior periphery is furnished with numerous oak pins upon which the skins fall by force of gravity. This process takes from ten to forty-five minutes. Small skins, such as those of kids and lambs, intended for glove leather, are softened by working them over a clean wooden beam with a dull fleshing knife.

Swelling and depilating are two simultaneous processes. By the "swelling" process the cellular tissue, in which the hair is rooted, is so far loosened as to allow the hair to be removed by subsequent mechanical manipulation. At the same time the epidermis becomes sufficiently loosened to be readily taken off. The principal processes used for "depilating" are the cold-sweating process, the liming process, and the chemical treatment.

The "cold-sweating" process of depilating is chiefly used in New York, New Hampshire, and Pennsylvania. The hides are allowed to hang in a vault having a temperature of 50°-57° F. for about ten days or more until they ferment and partly putrefy at their surfaces. The products of decomposition are afterwards removed by the quick change of air in the vault in which the hides are suspended. Depilating by "liming" is done by steeping the skins in milk of lime. The strength of the lime bath varies greatly. The skins remain in the bath, with frequent handlings, until the hair is loosened.

In the "chemical treatment" sulphide of sodium is mostly employed. The skins are placed in a 1 per cent. solution of the sulphide for about five days, with frequent handling. This process is quicker than the liming process. Various other ways of treating the softened hides chemically have been tried with different degrees of success.

For "unhairing" the skins are placed on the beam and the hair and epidermis are then scraped off with a knife or a machine. The McDonald unhairing machine, for instance, is in practical operation in many large tanneries at Salem, Peabody, Woburn, and other Massachusetts towns. After the scarf-skin and the hair are removed the hide is "fleshed," that is, the fatty matter and flesh are removed from the flesh side with a knife, called the "fleshing knife." Afterwards the hides are immersed in a slightly acid solution which neutralizes any lime that has remained in the pores.

Now the hides are placed one by one into the "lay-away" pits or vats, where the actual tanning takes place. Upon each one a thin layer of ground bark is sprinkled, in order that the tan-liquor may circulate uniformly. About eighty-five hides are laid away in one "pack," and supplied four or five times with fresh tan-liquor of successively increasing strength, about five months being required to tan the best qualities of sole-leather. For the further treatment, after tanned hides have been removed from the tan-pits or vats, see Britannica, Vol. XIV, p. 385.

Tawing consists in dressing the skins with antiseptic material, so as to preserve them from decay. By this operation no chemical change is effected in the gelatine of the skins; hence tawed leather can be used in the manufacture of glue. In tawing the first process is careful washing; next comes dressing them with lime; then removing the hair or wool; and lastly, steeping them in solutions of alum, salt, or other substances or mixtures, which convert the skins into leather.

Another kind of dressing skins for leather is by treating them with oil. By hard rubbing with cod-fish oil, after the skin has been properly cleaned with lime, the oil works itself into the pores of the skin, displaces all the water therein contained, and becomes united with the skin's material, rendering its texture peculiarly soft and spongy. "Wash-leather" or "chamois-leather" is so prepared and for this purpose the flesh-halves of split sheepskins are chiefly used.

Besides tanning and tawing, many kinds of leather require the "currier's" or leather dresser's art to bring them to the state of perfection required for the various trades. In "currying" almost every variety of leather requires some particular variation of the process employed, although the object in all cases is to impart suppleness and a fine finish to the article.

For Morocco leather, which is partly imported from France and the African coast of the Mediterranean, but now most largely manufactured in this country, the sheepskins and split calf-skins are

sewed together at the edges so as to form a bag, the grain side being outward. An opening is left at the hind shanks of the skin. These bags are then filled with sumac liquor, which is gently forced through the pores of the skin. This tanning operation usually lasts only about three hours. After its completion the sewing thread is cut and drawn out and the refuse sumac material is removed from the skins, which are next washed in a revolving drum and hung up in an airy loft to dry. After removing them from the drying-loft the skins are made wet with soap-water and shaved on their flesh-side. Then they are again dried in the loft. Lastly they are separated into classes, one class of which is "stained" on the flesh side, and the other is "pebbled." The Morocco leather made in this country is usually classified thus: Imitation of French kid, brushed kid, glazed kid, pebbles, straight-grained goat, and oiled goat.

For the "imitation of French kid" the skins are stained on the grain side with a black, sometimes made by boiling together four ounces of pulverized nut-galls, and two ounces of blue vitrol in one gallon of logwood liquor, and afterwards adding four quarts of vinegar saturated with iron. Several other kinds of black are employed. After being blacked by several successive applications of blacking liquor the skins are dried, then oiled with sperm-oil and glazed two or three times according to the brightness of the finish desired.

For the finishing of "brushed kid" the skins are blacked on the grain side with a preparation made by suspending five pounds of iron in twenty-five gallons of strong vinegar for four weeks, and then adding for each quart of this solution half a pint of bullock's blood, either warm or coagulated. After being blacked with this preparation the skins are made wet with gum-water and then brushed with a soft brush. Next they are scraped on the flesh side with a steel slicker, and oiled on the grain side with the beat of sperm-oil.

For finishing "pebble-grained goat" and "straight-grained goat" the skins are seasoned and blacked with a preparation of bullock's blood, logwood, boiled milk, water and a small quantity of vinegar black. After hanging in the drying-loft over night they are glazed, and then grained twice and oiled with sperm-oil. For "oiled goat" the skins are also blacked, and then stuffed on the flesh side with a dubbing composed of oil and tallow. After drying them the oiled skins are grained in various ways, then treated to a coat of dubbing on the grain side which is afterwards flattened down with a dull slicker, and lastly they are treated with a coat of fine sperm-oil.

For "dyeing leather" with aniline colors the skins are seldom mordanted, but simply steeped in the coloring solution, which is mostly aqueous. Alcoholic solutions are only used in exceptional cases.

Morocco leather is remarkable for its softness, glossiness, and pliability. It is largely used for the uppers of ladies' and children's shoes, for fine book-bindings, carriage-linings, pocket-books, traveling-bags, toilet-cases, and portfolios. The Germans call that kind of Morocco which is dyed with bright colors by the distinctive name of "Saffian" leather; Morocco is only the black-finished kind mainly used for shoe work. Saffians are mostly red or yellow. The leading places for the manufacture of these light and soft leathers in the United States are Philadelphia, Pa., Newark, N. J., Wilmington, Del., and Lynn, Mass.

The manufacture of leather is very widely distributed in the United States, where, in 1880, there were 3,105 tanneries and 2,319 establishments for currying leather. The total capital invested was

sixty-seven millions of dollars; the total number of hands employed was 34,860. The materials used were valued at 145 millions of dollars, and the total products had a value of 185 millions of dollars. The wages earned by the workmen amounted to \$14,050,000.

The following twenty States produced tanned and curried leather to the amounts stated after their respective names: Massachusetts, thirty-seven millions; Pennsylvania, thirty-five millions; New York, thirty millions; New Jersey, fourteen and five tenths millions; Maine, nine and seven tenths millions; Wisconsin, eight and eight tenths millions; Ohio, eight and two tenths millions; Illinois, seven and eight tenths millions; California, five and seven tenths millions; New Hampshire, four and five tenths millions; Michigan, three millions; Kentucky, three millions; Indiana, two and seven tenths millions; Tennessee, West Virginia and Maryland, two millions each; Vermont, one and six tenths millions; Virginia, one and two tenths millions; Rhode Island, eighty-five hundredths millions; Missouri, seventy-five hundredths millions.

For ARTIFICIAL LEATHER, which is largely sold under the name of LEATHEROID, see Britannica, Vol. XIV, p. 391.

LEATHER-BOARD, an imitation of sole leather much used in the manufacture of boots and shoes. It is made of leather scraps, old manila rope, hemp rope, rags, paper, etc., ground to a pulp and mixed with certain chemicals which render it more impervious to water than leather is. It is then run off, dried and pressed in the same manner as paper, and used as stiffenings for boots and shoes, also for toys, chair-bottoms, etc. It was first manufactured in this country.

LEATHERWOOD, or MOOSEWOOD (*Dirca palustris*), a deciduous shrub three to six feet high, with the habit of a miniature tree, a native of North America. It belongs to the natural order *Thymelaceæ*. The bark and wood are tough, and in Canada the bark is used for ropes, baskets, etc. The leaves are lanceolate-oblong; the flowers are yellow and appear before the leaves.

LEATHES, STANLEY, an English clergyman, born at Ellesborough, Buckinghamshire, in 1830. After being educated at Jesus College, Cambridge, he held several curacies in London, and in 1863 was made professor of Hebrew in King's College, London. He became successively Boyle lecturer at London, Hulsean lecturer at Cambridge, Bampton lecturer at Oxford and Warburtonian lecturer at Lincoln's Inn. He was also one of the revisers of the Old Testament, and has published *The Witness of the Old Testament to Christ*; *Witness of St. Paul to Christ*; *Witness of St. John to Christ*; *Structure of the Old Testament*; *The Gospel Its Own Witness*; *Religion of the Christ, Its Development*; and *The Christian Creed, Its Theory and Practice* (1878).

LEAVENWORTH, a city, the county-seat of Leavenworth county, Kans., beautifully situated on the west bank of the Missouri River, about 30 miles northwest of Kansas City. It is the oldest town in the State. The extensive military establishment of Fort Leavenworth adjoins the city on the north. Eight railroads converge here, and a splendid iron railway bridge crosses the river. Leavenworth has a fine park, an ample water-supply, a good system of sewerage, street railways and a telephone exchange. Good bituminous coal is mined here, and fine building-stones are quarried. Among the thriving manufactories are flour, lumber, glucose, bricks, wagons, furniture and machinery. The town was incorporated in 1856. Population in 1890, 20,250. See Britannica, Vol. XIV, p. 391.

LEAVITT, JOSHUA, an American journalist, born at Heath, Mass., in 1794, died in Brooklyn, N. Y., in 1878. After practicing law at Putney, Vt., for some years, he studied theology at New Haven, and was ordained Pastor at Stratford, Conn., in 1825. In 1831 he founded the "New York Evangelist" to advocate the revival system in the Presbyterian Church. As he was also prominent in the anti-slavery agitation, he had to flee for a time from New York. In 1837 Leavitt became editor of "The Emancipator," which he removed to Boston in 1841. From 1844 to 1847 he was chairman of the National Committee of the Liberty Party. In 1848 he became the managing editor of the New York "Independent" and contributed to its pages for many years.

LEBANON, a city of St. Clair county, Ill., a summer resort for the people of St. Louis, from which city it is 23 miles east. It is noted for its educational advantages, is the seat of McKendree College (Methodist), organized in 1828, has churches, mills, a machine-shop, and various other manufactures.

LEBANON, a city, the county-seat of Boone county, Ind., 26 miles northwest of Indianapolis. It has various factories and mills. Population, 3,676.

LEBANON, a post-village, the county-seat of Marion county, Ky., on a railroad. It is a shipping point for various adjoining counties, and manufactures carriages and furniture. A Baptist female college is here, two Roman Catholic academies and a high-school. Population, 2,805.

LEBANON, a post-village, the county-seat of Laclede county, Mo., on the Atlantic & Pacific Railroad. It is a business center for the surrounding region, is 185 miles southwest of St. Louis, and contains an excellent seminary.

LEBANON, a village and township of Grafton county, N. H., on the Mascoma River, four miles from White River Junction, Vt. It manufactures furniture, iron castings, elastic sponges and agricultural implements. West Lebanon, on the Connecticut River, is the seat of the Tilden Ladies' Seminary. The village is furnished with water-power by the Mascoma River, and the town has railroad-shops and various industries. Population in 1880—village, 1,954; township, 3,354.

LEBANON, a post-village, the county-seat of Warren county, Ohio, 30 miles northeast of Cincinnati. It has a national bank, a normal-school, an orphans' home, a county infirmary and planing-mills. Population, 3,174.

LEBANON, a post-village, the county-seat of Wilson county, Tenn. It has manufactures of woolen goods and flour and contains a business and telegraph college, two female seminaries, and is the seat of Cumberland University.

LEBANON SPRINGS, a post-village and summer resort of Columbia county, N. Y. It contains a mineral spring whose waters possess curative qualities in certain diseases. The water is sufficiently abundant to furnish valuable motive-power. Thermometers and pharmaceutical preparations are made in the vicinity. There are several Shaker communities near the village, and a hotel at which Lafayette was a guest. See *Britannica*, Vol. XVI, p. 436.

LECKY, WILLIAM EDWARD HARTPOLE, a British historian, born near Dublin, in 1838. After graduating at Trinity College, Dublin, in 1859, he devoted himself to a literary career, but traveled extensively on the continent before he settled down in London. His chief literary work is *History of the Rise and Influence of the Spirit of Rationalism in Europe* (1865). After this came a *History of Euro-*

pean Morals from Augustus to Charlemagne; and a *History of England in the Eighteenth Century* (1878-90). His works combine deep learning with elegance of style.

LECOQC, ALEXANDER CHARLES, a French musician, born at Paris, June 3, 1832, and trained at the Conservatoire. He is regarded as the best successor of Auber in comic opera. His best-known works are *La Fille de Madame Angot*, *Giroflé-Girofla* and *Le Petit Duc*.

LÉCOMPTON, a post-village of Douglas county, Kan., on the south branch of Kansas River. It is the seat of Lane University (United Brethren). Formerly the village was the territorial capital of Kansas.

LE CONTE DE LISLE, CHARLES MARIE, a French poet, born on the Island of Réunion, October 23, 1820. He was carefully educated, and after some years of travel settled to a literary life in Paris. In 1886 he succeeded to Victor Hugo's chair at the Academy. His *Poèmes Antiques* and *Poésies Nouvelles* he collected as *Poésies Complètes* in 1858. Other volumes are *Poèmes Barbares* (1862) and *Poèmes Tragiques* (1884).

LE CONTE, JOSEPH, an American geologist, born in Liberty county, Ga., in 1823. After graduating at Franklin College, Athens, Ga., and obtaining his degree of M. D. at the College of Physicians and Surgeons in New York, he practiced as a physician at Macon, Ga., for several years. In 1850 he entered the Lawrence Scientific School at Harvard, and studied natural history under Prof. Louis Agassiz, accompanying the latter on an exploring expedition to Florida in 1851. In 1852 he was made professor of natural sciences in Oglethorpe College, and a year later in Franklin College. In 1857 he accepted the professorship of chemistry and geology in South Carolina College, and in 1869 he became professor of natural history and geology in the University of California, which chair he held up to our latest account. Beside many important scientific papers, Prof. Le Conte has published essays on education and the fine arts, and the *Mutual Relations of Religion and Science*; *Elements of Geology*; *Light, the Principles of Monocular and Binocular Vision*; and *Evolution, Its Nature, Evidences, and Its Relation to Religious Thought* (1887).

LE CONTE, JOHN, an American physicist, born in Liberty county, Ga., in 1818, died April 29, 1891. He graduated at Franklin College, Athens, Ga., in 1838, and in 1841 at the College of Physicians and Surgeons, New York. After practicing for some years as a physician at Savannah, he was made professor of natural philosophy in Franklin College in 1846, and in 1856 became professor of the same branch in South Carolina College, at Columbia. In 1869 Le Conte was appointed professor of physics and industrial mechanics in the newly-founded University of California, and in 1875 he became president of that university. His scientific work extends over nearly 50 years. He published important papers on physical science in many periodicals both here and in England, and delivered lectures on the "Physics of Meteorology" at the Smithsonian Institution in Washington, D. C. (1857), and on the "Stellar Universe" at the Peabody Institution in Baltimore, Md. (1867). Since 1867 Prof. Le Conte has been an active member of the National Academy of Science.

LE CONTE, JOHN EATON (1784-1860), an American naturalist, born near Shrewsbury, N. J., in 1784. In 1818 he entered the corps of topographical engineers of the United States army, and remained in that service till 1831, taking part in various surveys. Having attained the rank of major, he retired from the service in the last-mentioned year

in order to devote himself to the study of botany and zoology. He wrote and published several papers on insects, as the "North American Butterflies," also some papers on mammals, reptiles, batrachians and crustacea. He died at Philadelphia, in 1860, leaving a considerable collection of insects and an extensive series of water-color illustrations of American insects and plants, that he had made with his own hands.

LE CONTE, JOHN LAWRENCE (1825-1883), an American naturalist, the son of the former, born at New York in 1825. As a student at Mount St. Mary's College, Emmetsburg, Md., and at the College of Physicians and Surgeons, New York, he devoted considerable attention to the study of natural history, which he subsequently extended. He visited the Lake Superior region three times, the Rocky Mountains, California, New Mexico, Honduras, Panama, Europe, Egypt, Algiers, etc., collecting many specimens of insects, especially of the coleoptera, upon which he published several memoirs. In 1862 he entered the United States army as a surgeon of volunteers. Afterwards he was made medical inspector of the regular army, with the rank of lieutenant-colonel, which he retained until the end of the war. Then he became chief clerk of the United States mint at Philadelphia, and remained in this position until his death in 1883. The Smithsonian Institution published his *Classification of the Coleoptera of North America* and his *List of the Coleoptera of North America* (1862-73).

LECTERN (Lat. *lectorium*, or *lectricium*), a reading-desk from which the Scripture lessons which form a portion of the various church services are chanted or read. The most ancient lecterns are of wood, but they were frequently made of brass, often in the form of an eagle (the symbol of St. John the Evangelist), the outspread wings of which form the frame supporting the volume.

LECYNTHIDACEÆ, a natural order of exogenous plants, or sub-order of *Myrtaceæ*. The fruit is a large woody capsule, with a number of cells, which in some species opens with a lid. All the known species, about 40, are natives of the hottest part of South America. Brazil nuts are the seeds of trees of this order. The cannon-ball tree (*Lecythis Ollaria*) belongs to it. See *Britannica*, Vol. XVII, p. 665.

LEDBURY, an old market-town of Herefordshire, England, 13 miles from Hereford. It has an interesting church, St. Catherine's Hospital (1232; rebuilt 1822), and a clock-tower (1890) to the memory of Mrs. Browning. Population of parish (1881), 4,276.

LEDOCHOWSKI, MIRCISLAS HALKA, a polish prelate, born at Gork in 1822. After making him domestic prelate, the pope sent him on several diplomatic missions. In 1861 he was made archbishop of Thebes *in partibus*, and in 1866 archbishop of Gnesen and Posen, becoming thereby primate of Poland. When, in 1873, the "Falk Laws" restricted the influence of the Catholic clergy of Prussia over the schools and over the laity, Ledochowski protested against them, and was imprisoned till 1876. The pope made him cardinal in 1875. But when he was released from prison, Ledochowski was not allowed to enter his diocese. He resigned his see in 1885, while he was living at Rome.

LEDUM, a genus of plants of the natural order *Ericaceæ*, sub-order *Rhodoraceæ*, consisting of small evergreen shrubs with large flowers, of which the corolla is cut into five deep petal-like segments. The species are natives of Europe and North America, and are commonly known as Labrador tea. Sir John Franklin and his party, in the Arctic expedition of 1819-22, are said to have used the

Ledum palustre for tea. The leaves possess narcotic properties, and are regarded as useful in agues, dysentery and diarrhoea.

LEE, a post-village of Lee township, Berkshire county, Mass., on the Housatonic River and Railroad, 11 miles south of Pittsfield. It has a public library, excellent schools, a number of paper-mills, several iron-foundries and machine shops, and extensive woolen-factories. The township has quarries of fine white marble, which is exported to distant cities. Population of township in 1890, 3,778.

LEE, or LEEWARD, a nautical term for the quarter to which the wind is directed, as distinguished from windward, or the part whence the wind comes.

LEE, ANN (1786-1784), the founder of the sect of Shakers, born at Manchester, England, Feb. 29, 1786, died at Watervliet, N. Y., Sept. 8, 1784. She was early married to Abraham Stanley, a blacksmith. In 1758 she joined the Manchester Society of Friends and in 1774 emigrated to New York with eight of her disciples to establish in this country the Church of Christ's second appearing. At Watervliet, near Albany, N. Y., she founded a settlement, gathering in many disciples during a religious revival in 1780. In 1781 she and her elders set out on a missionary tour through New England and founded Shaker societies at Harvard, Mass., and other places. See *Britannica*, Vol. XXI, p. 736.

LEE, ARTHUR, an American statesman, born at Stratford, Westmoreland county, Va., in 1740, died in Middlesex county, Va., in 1792. After studying medicine he commenced to practice as a physician at Williamsburg, Va., but after a few years he went to London to study law, where he was admitted to the bar in 1770. In 1774 Lee presented to the British ministry the addresses of the American Congress to the people and King of England. In 1777 he was sent to Spain, and afterwards to Prussia, to enlist sympathy for the American cause. After serving in Congress in 1782, he was in 1784 made one of the commissioners to negotiate treaties with the Indians of the Northwest, and was from 1785 to 1789 a member of the Board of Treasury.

LEE, CHARLES, an American general, born at Dernhall, Cheshire, England, in 1731, died at Philadelphia, Pa., in 1782. When 20 years of age he became a lieutenant in his father's regiment, and was ordered to America to take part in Braddock's expedition to Fort Duquesne. He was present at Braddock's defeat at Monongehela in 1755, and fought in 1756 at Ticonderoga, where he was wounded. In 1760 he returned to England, served successively in the Portuguese, Prussian, Polish and Russian armies, and came to America in 1773, when he espoused the cause of the Revolutionary party. In 1775 Congress appointed him second major-general of the Continental army, after he had purchased an estate in Berkeley county, Va., Artemas Ward being the first major-general, and in July Lee joined the army at Cambridge, Mass., and was placed in command of the left wing, with his headquarters at Winter Hill, now Summerville. In November he visited Newport, R. I., where his military genius displayed itself in the arrest of a few Tory citizens. Thence he proceeded to New York, and commenced the erection of some fortifications, when he was put in command over the Southern department. When the British fleet attacked Fort Moultrie at Charleston on June 28, 1776, Col. Moultrie won a brilliant victory, the credit of which was by most people given to Lee, the latter being called the "hero of Charleston." In the autumn Lee joined Washington, and his

division covered the retreat of the American army from Manhattan Island. When Washington passed into New Jersey, Lee was left in Westchester county, N. Y., with 7,000 men. Washington had ordered him to join the main army by crossing the Hudson. But Lee did not stir for two weeks. On December 18 he was himself surprised and captured at Baskingridge, N. J., while separated from his own forces. In May, 1778, Lee was exchanged, and rejoined the American army at Valley Forge. He opposed the attack of the British troops on their withdrawal from Philadelphia to New York, yet commanded the van at the battle of Monmouth, June 28. His troops were, through his own negligence, thrown into confusion by an unexpected attack by the British rear-guard, and he ordered a retreat against the express command of Washington. For his insubordination and other unbecoming conduct he was by court-martial suspended from command for one year, and retired to his estate in Virginia. At the end of the year his commission was revoked, in consequence of an insulting note he had written to the President of Congress.

LEE, FRANCIS LIGHTFOOT, an American statesman, born at Stratford, Westmoreland county, Va., in 1734, died at Richmond, Va., in 1797. In 1765 he was elected to the house of burgesses, and in 1775 was sent by it to Congress. Here he signed the Declaration of Independence, and assisted in framing the Articles of Confederation as a member of the committee for that purpose.

LEE, FREDERICK RICHARD, an English landscape-painter, born at Barnstable, Devonshire, in June, 1798, died in Cape Colony, June 4, 1879. He chose the army as a profession, but was subsequently obliged by ill-health to quit it. He then turned his attention to painting, was an exhibitor at the Royal Academy from 1824 till 1870, and acquired a high reputation for landscapes, especially of English and Scotch scenery. He was elected an A. R. A. in 1834, and R. A. in 1838, retiring in 1871.

LEE, HENRY, an American soldier, born at Stratford, Westmoreland county, Va., in 1756, died at Cumberland Island, Ga., in 1818. In 1776 he became captain of cavalry, and in 1778 he was placed in command of an independent corps, with the rank of major, and was then popularly known as "Light Horse Harry." In 1779 he received a gold medal from Congress for capturing Paulus Hook. He assisted Greene in the capture of Augusta, Ga., and took part in the battle of Eutaw Springs. After being a member of Congress he was in 1792 chosen governor of Virginia; and in 1794 he commanded the force sent by President Washington for the suppression of the Whiskey Insurrection in western Pennsylvania. When Washington died in 1799, Lee, then again a member of Congress, pronounced his eulogy, and drafted the resolutions for the occasion, in which he designated Washington as "first in war, first in peace and first in the hearts of his countrymen." After Jefferson's election to the presidency, Lee retired from public life. His profuse expenditures involved him in debt, for which he is said to have been imprisoned. Henry Lee was the father of the Confederate general, Robert E. Lee, for whom see *Britannica*, Vol. XIV, p. 399.

LEE, LUTHER, an American clergyman, born at Schoharie, N. Y., in 1800. He joined the Methodist Episcopal Church in 1821 and became an itinerant preacher in northern New York. In 1836 he began to preach and lecture against slavery, and was several times attacked by mobs. In 1841 he founded and edited the "New England Christian Advocate," an anti-slavery journal, at Lowell,

Mass., and subsequently he edited "The Sword of Truth" and "The True Wesleyan." When in 1843 the "Wesleyan Methodist Connection" was organized, he became pastor of that church at Syracuse, N. Y., and afterwards at Fulton, N. Y. In 1856 Lee became president and professor of theology in the Michigan Union College at Seoni, but resigned the next year to officiate in churches in Ohio. From 1864 till 1867 he was professor at Adrian College, Mich. Lee has published *Universalism Refuted; Immortality of the Soul; Church Policy; Slavery Examined in the Light of the Bible* (1855), and *Elements of Theology*.

LEE, ROBERT, a Scotch clergyman, born at Tweedmouth, England, in 1804, died at Torquay in 1868. After graduating at the University of St. Andrews he was ordained in the Church of Scotland in 1832. He became successively minister of Arbroath, Campsie and Old Grey Friars' Church in Edinburgh. In 1846 Lee was made professor of Biblical criticism in the University of Edinburgh. In 1857 he published *Prayers for Public Worship*, and used these prayers in his congregation. For this he was tried in the church courts and acquitted. Afterwards he published *The Reform of the Church of Scotland in Worship, Government and Doctrine*, and introduced an organ in his church in 1865. For this innovation he was again tried in both the ecclesiastical and civil courts. His most important work was a *Reference Bible* (1864), having about 60,000 references.

LEE, SAMUEL, an English orientalist, born at Longnor, in Shropshire, May 14, 1783, died at Barley, Hertfordshire, Dec. 16, 1852. He received his first instruction at a charity school, and was at the age of twelve apprenticed to a carpenter. While engaged at his trade he acquired the chief classical, Oriental, and modern languages, subsequently studied at Queen's College, Cambridge, and took orders in the church. In 1819 he became university professor of Arabic, and in 1831 regius professor of Hebrew. He published a *Grammar of the Hebrew Language; Book of Job, Translated from the Original Hebrew, and Hebrew, Chaldee and English Lexicon*. He also wrote *Sermons on the Study of the Holy Scriptures; Events and Times of the Visions of Daniel and St. John*, and an *Inquiry Into Prophecy*. He took charge for the British and Foreign Bible Society, of editions of the Syriac Old Testament, the Syriac New Testament, the Malay, Persian and Hindustani Bibles, and the Psalms in Coptic and Arabic.

LEECHBURG, a post-borough of Armstrong county, Pa., on the Pennsylvania Central Railroad and Pennsylvania Canal, 35 miles northeast of Pittsburgh. It has an academy, a wagon and carriage manufactory, tin-factory and rolling-mill.

LEECH LAKE, a lake about twenty miles long and sixteen miles wide in the northern part of Minnesota, about seven miles south of Lake Cass. Its surplus water is discharged by a short outlet into the Mississippi River. Elevation, 1,330 feet.

LEESBURG, a post-village, a railroad center and the county-seat of Sumter county, Fla., lying between Harris and Griffin lakes. It is a center of the orange region and from here large quantities of oranges and early vegetables are shipped.

LEESBURG, a post-village; the county-seat of Soudoun county, Va., thirty-six miles northwest of Washington, D. C. It contains a male and female seminary, and planing and saw-mills. The battle of Balls' Bluff was fought two miles from the town.

LEETONIA, a post-village and a railroad junction of Columbiana county, O., sixty-five miles northwest of Pittsburgh. It has rolling and plan-

l.-g.-mills, coal-mines, coke-ovens, blast-furnaces, roller-works, a nail and bolt mill, a foundry and lumber yards.

LEFEBVRE, FRANÇOIS JOSEPH, Duke of Danzig and Marshal of France, born at Ruffach, in Alsace, Oct. 25, 1755, died in Paris, Sept. 14, 1820. He entered the army at the age of eighteen, and was sergeant in the French Guards when the Revolution broke out. He was engaged for some time on the Moselle and Rhine, fought at Fleurus, Altenkirchen, and Stockach, and rose in rank with wonderful rapidity. In 1799 he took part with Bonaparte in the overthrow of the Directory, and in 1804 was made a Marshal of the Empire. He also conducted the siege of Danzig, and after its capture was created Duke of Danzig. He distinguished himself in the early part of the Peninsular war, and suppressed the insurrection in the Tyrol. During the Russian campaign he commanded the Imperial Guard, and in 1814 he left the wing of the army which resisted the advance of the allies in France. Submitting to the Bourbon's after Napoleon's abdication, he was made a peer, a dignity restored to him in 1819 though he had sided with his old master during the Hundred Days.

LEFORT, FRANÇOIS JACOB, favorite of Peter the Great, born at Geneva in 1656, of Scottish descent, died March 12, 1699. At the age of fourteen he went to Marseilles and enlisted in the Swiss guard in the French service; in 1674 he left France and entered the service of the Netherlands, and in the following year went to Russia, where he first held a position as secretary to the Danish ambassador, and afterwards became a captain in the Russian army. Having taken a leading part in the intrigues which made Peter the sole ruler after the death of his brother Ivan, Lefort was advanced to be first favorite of the Czar, and next to him was the most important personage in Russia. A man of great ability, he assisted Peter in his projects of reform, remodelled the army and laid the foundations of the navy, and in 1694 was made admiral and generalissimo. When Peter undertook his visit to foreign countries in 1697 Lefort was made chief of the embassy of the train in which the czar traveled *incognito*.

LEGAL HOLIDAY, see HOLIDAYS, LEGAL, in the United States, in these Revisions and Additions.

LEGAL-TENDER, currency with which debts can be paid lawfully. All gold coins are legal-tender at their nominal value, if they have the standard weight and fineness. Silver coins smaller than \$1 are a legal-tender in sums up to \$10; but not in sums exceeding \$10. The trade dollar of 420 grains is not a legal-tender, but the silver dollar of 412½ grains is a legal-tender for all debts and dues, except otherwise expressly stipulated. The 5-cent, 3-cent, 2-cent, and 1-cent pieces are a legal-tender only in sums up to 25 cents in any one payment. All United States notes are a legal tender in payment of any debt, except for duties on imports and interest on the public debt.

LEGARÉ, HUGH SWINTON (1789-1843), an American statesman, born at Charleston, S. C., in 1739, of Huguenot descent. He was made attorney-general of South Carolina in 1830. At the same time he became chief-editor of the "Southern Review." In 1837 he entered Congress, but his financial views dissatisfied his constituents and he failed of reelection. In 1841 President Tyler nominated him for attorney-general of the United States, and when Daniel Webster withdrew from the cabinet in May 1843 Legaré was appointed to fill the vacancy. He died suddenly in Boston on June 2, 1843, while attending, with President Tyler, the ceremonies at the unveiling of the Bunker Hill monument. Chief-Jus-

tice Story said of Legaré "His argumentation was marked by the closest logic; at the same time he had a presence in speaking I have never seen excelled."

LEGATO (Ital. "tied"): in music, means that the passage is to be performed in a smooth manner, the notes being played as if bound or tied together; opposed to staccato.

LEGATUM REI ALIENÆ: in the Roman Law, the bequest of a thing which does not belong to the testator.

LEGER-LINES: in music, the name of the short lines above or below the staff which are used to express those notes which extend beyond the five lines of the staff.

LEGGE, JAMES, a Scotch sinologue, born at Huntly Aberdeenshire, in 1815. After studying theology at Highbury College, London, he was in 1839 sent by the London Missionary Society to take charge of the Anglo-Chinese College at Malacca and in 1843 removed to Hong Kong, where he performed the functions of a missionary for thirty years. In 1875 Dr. Legge was made professor of the Chinese language at Oxford. He wrote a book on *The Notions of the Chinese Concerning God and Spirits*, in order to determine the controversy about the proper term for the Supreme Being in Chinese. His most important literary undertaking is his edition of the *Chinese Classics*, giving the original text, English translation, explanatory notes, and copious prolegomena.

LEGOUVÉ, GABRIEL JEAN BAPTISTE ERNEST WILFRED, a French dramatist and author, born at Paris in 1807. After publishing some novels he turned his attention to writing dramas, as *Louise de Lignorolles*, and *Adrienne Lecouvreur*, which latter was made famous by Rachel in 1849. He also wrote some comedies, as *Les Doigts de fée*; *Béatrix*, dramatized from his novel of the same name; *Miss Luzanne*; *Les Deux reines de France*, etc. He also delivered popular lectures which were gathered under the title *Les Pères et les Enfants XIXe siècle* (1867-69).

LEGROS, ALPHONSE, a French-English painter, born at Dijon in 1837. He studied painting at Lyons and Paris, and exhibited a portrait of his father at the Paris Salon when he was only nineteen. Champfleury seeing this portrait encouraged the young artist. In 1859 Legros produced *The Angelus*; in 1861 *Exvoto*; and other works followed. Removing to England in 1863 his rustic simplicity found more favor than in Paris. He became Slade professor in University College, London, and also taught painting in the South Kensington Museum. Among his later works are: *The Pilgrimage*; *The Spanish Cloister*; *The Baptism*; *The Coppersmith*, and several portraits. His works have become widely known through engravings and lithographs.

LEHIGH RIVER, one hundred and twenty miles long, rises in Wayne county, Pa., and flows through a hilly and picturesque region, where much anthracite coal is found. After flowing in a southwesterly and then a southeasterly course it turns northward and reaches the Delaware River at Easton. It is navigable for seventy miles from that point, and touches in its course Whitehaven, Mauch Chunk, and Allentown, passing through a gorge or gap in the Kittatinny Mountain.

LEHIGHTON, a post-borough of Carbon county, Pa., situated on the west bank of the Lehigh River.

LEHIGH UNIVERSITY, see COLLEGES in these Revisions and Additions.

LEIDY, JOSEPH, an American naturalist, born at Philadelphia, Pa., Sep. 9, 1823, died there April 30,

1891. He graduated in the medical department of the University of Pennsylvania in 1844. In 1845 he became professor to the chair of anatomy of the same school, and in 1846 demonstrator of anatomy in the Franklin Medical College. In 1853 Dr. Leidy was made professor of anatomy in the University of Pennsylvania, and in 1871 he was called to the professorship of natural history in Swarthmore College, which position he held till 1884. On the establishment of the department of biology in the University of Pennsylvania in 1884, Dr. Leidy became its director. He held this office to the time of his death.

He was a member of numerous scientific societies, and published some 800 papers on biological subjects. His principal works are *Memoir on the Extinct Species of the American Ox*; *A Flora and Fauna Within Living Animals*; *Ancient Fauna of Nebraska*; *On the Extinct Sloth Tribe of North America*; *Cretaceous Reptiles of the United States*; *The Extinct Mammalian Fauna of Dakota and Nebraska*, and *Extinct Vertebrate Fauna of Western Territories*. Leidy is also the author of *An Elementary Text-book on Human Anatomy* (1861).

The value of Dr. Leidy's scientific work was substantially recognized by the council of the Boston Society of Natural History, which awarded him the Walker prize. On account of the extraordinary merit of his researches, the prize, which usually consists of the sum of \$500, was on the occasion increased to \$1,000.

LEIDY, PHILIP, an American physician, born at Philadelphia, Pa., in 1838, died there April 29, 1891. He studied medicine at the University of Pennsylvania under the preceptorship of his brother, Dr. Joseph Leidy. After graduating in 1859, he became resident physician at the Philadelphia (Blockley) hospital. At the outbreak of the civil war he entered the army as a surgeon, and remained in it till 1865. For four years after the war he was United States examining surgeon at Philadelphia. In 1874 Governor Hartranft appointed him port physician of Philadelphia, and subsequently he was also made physician-in-chief of the insane department of the Philadelphia hospital, which position he held till his extensive private practice compelled him to resign in 1887. Dr. Leidy was a member of the Medico-Chirurgical Society, and also of the county and State medical societies, as well as of the American Medical Association. He read numerous papers before the societies mentioned, and contributed in other ways to the medical literature of the day.

LEIGHTON, SIR FREDERICK, a painter, born at Scarborough, England, in 1830. He studied at Rome, Berlin, Brussels, Paris, and Frankfurt. In 1855 he finished the picture *Cimabue's Madonna Carried in Triumph*, which created a sensation in London, and was purchased by the queen. In 1869 he was elected a member of the Royal Academy, of which body he became president in 1878, when he was also knighted. Most of his works are excellent. We mention among his best pictures *Orpheus and Eurydice*; *Venus Disrobing*; *Jonathan's Token to David*; *After Vespers*; *The Arts of Peace*, and *The Music Lesson*. At Paris he exhibited in 1878 also a work of sculpture, *An Athlete Strangling a Python*.

LEININGEN, a mediatised princely house of Germany, dating to 1096. In 1779 the head of one of the branches into which it had become divided, the count of Leiningen-Dachsburg-Hardenburg, was raised to the rank of a prince of the empire, but the peace of Luneville deprived him of his ancient possessions on the left bank of the Rhine. Though no longer an independent prince the head of the house retains his rank and wealth. The mother of

Queen Victoria had for her first husband the Prince of Leiningen.

LEISLER, JACOB, an American soldier, born at Frankfurt, Germany. He came to this country in 1660 as a soldier in the service of the Dutch West India Company. He engaged in trading with the Indians and became wealthy. While on a voyage to Europe in 1678 he was captured by Moorish pirates and compelled to pay a heavy ransom. He afterwards resided in the first brick house built in New York. In 1683 Governor Dongan appointed him one of the judges of the court of admiralty in New York, and in 1689 Leisler was made captain of one of the five militia companies of the city. He was popular with the men. When William and Mary succeeded to the throne of England, Leisler united the people for the "defense of the protestant religion," and was made the head of the provisional government of New York. He strengthened the fort with the battery of six guns beyond its walls, which gave its name to the park. After the massacre at Schenectady, by the French and Indians in February, 1690, Leisler sent men-of-war against Quebec and displayed laudable energy. Meanwhile Major Ingoldesby arrived with the news that Col. Henry Sloughter had been appointed governor of New York. When Sloughter arrived, in March, 1691, and demanded possession of the fort, Leisler refused to surrender it until he had convinced himself of Sloughter's identity. As soon as the latter had sworn in his council Leisler resigned his command, writing the governor a letter to that effect. Sloughter replied by arresting Leisler and nine of his friends. The latter were released after their trial; but Leisler was imprisoned, charged with treason and murder, and shortly afterwards tried and condemned to death, together with Milbourne, his son-in-law. On May 16, 1691, both of them were hanged. The judges were the personal and political enemies of the prisoners, and it is said that Sloughter signed the death warrant while he was under the influence of wine. In 1695 the attainder pronounced on Leisler was reversed by the English parliament, and three years later the New York assembly voted an indemnity to Leisler's heirs.

LEITOMISCHL, an old town of Bohemia, on the Lautschna, eighty-five miles east-southeast of Prague. It has a fine castle, a Piarist college, and manufactories of linens, woollens, jute, etc. Population, 5,258.

LELAND, CHARLES GODFREY, an American author, born at Philadelphia in 1824. After graduating at Princeton College in 1846, he spent two years in travel and study in Europe, and lived among the gypsies in various countries, becoming familiar with their language, beliefs, and customs. He is best known by his *Hans Breitmann's Ballads* (1870), in the dialect of the "Pennsylvania Dutch." Among his other writings are *Poetry and Mystery of Dreams*; *Meister Karl's Sketch-Book*; *Sunshine in Thought*; *Legends of Birds*; *Egyptian Sketch-Book*; *English Gypsies and Their Language*; *English Gypsy Poetry*, and *Algonquin Legends*.

LEMARS, a post-village, the county-seat and a railroad junction of Plymouth county, Iowa, twenty-five miles northeast of Sioux city. Population, in 1880, 1,895.

LEMMING, a small arctic field mouse. See Britannica, Vol. XIV, pp. 435-6, for a detailed account of the Norway lemmings. This rodent is not migratory in North America as is the Norway lemming in Norway. The Hudson Bay lemming (*Myodes torquatus*) inhabits the mossy and swampy regions of the arctic circle, as far south as Labrador in the Atlantic region, and further south in the Pacific

region. It is about five inches long, with a tail one-half inch long; has a reddish-brown color in summer, but is white in winter; is without external ears, but looks otherwise like the Norway kind. It burrows in the ground in summer, usually beneath stones; but in winter it inhabits a nest of moss which it seldom leaves. There are several species of this animal, which resemble one another in character and habits. They live on grass-roots and stalks, lichens, moss, etc., are inoffensive, easily tamed, and very fond of being caressed.

LEMOINNE, JOHN EMILE, a French journalist, born in London, Oct. 17, 1815. He pursued his earlier studies in England, and completed his education in France. He joined the staff of the "Journal des Débats" as English correspondent in 1840, was subsequently appointed editor of that newspaper, and has conducted it skillfully and successfully through all the vicissitudes of political strife. In 1876 he was elected a member of the academy. His *Etudes Critiques et Biographiques* (1852), and *Nouvelles Etudes* (1862), contain specimens of his best style.

LEMONGRASS (*Andropogon Schenanthus*), a perennial grass, a native of India and Arabia, 3 to 4 feet high, possessing a strong lemon-like fragrance. An essential oil is obtained from it which is used in perfumery, and an infusion of its leaves is used as tea. The name is also given to other fragrant species of the genus.

LEMON, MARK, an English journalist and humorist, born in London, Nov. 30, 1809, died at Crawley, Sussex, May 23, 1870. He was educated at Cheam, near Epsom, and about 1825 wrote a farce, the first of a long series of melo-dramas, operettas, etc. He also produced several novels, children's stories, and essays and appeared as a lecturer and public reader. In 1841 he helped to establish "Punch," of which for the first two years he was joint-editor with Henry Mayhew, and thereafter sole editor till his death.

LEMON, SALTS OF, a name applied by druggists to binxalate of potash mixed with a little of the quadroxalate; called also salts of sorrel. It is used to remove ink stains.

LEMONT, or ATHENS, a post-village of Cook county, Ill., twenty-six miles from Chicago, on the Chicago & Alton Railroad. It has quarries of fine Silurian limestone called Athens marble.

LE MOYNE, a distinguished French pioneer family, who rendered valuable services in Canadian exploration and colonization.

1. CHARLES LE MOYNE (1626-1683), born at Dieppe, France, the founder of the family, emigrated to Canada in 1641, lived four years among the Hurons, and afterwards at Villemarie, Canada, where he cultivated some land. Being attacked by the Iroquois, in May, 1651, Le Moyne collected his available forces and drove the Iroquois back with great slaughter. In 1668 Louis XIV. made him Sieur de Longueuil, and afterwards also de Chateauguay. For a long time he was captain of Montreal and took part in several expeditions against the Iroquois. Of his eleven sons BIENVILLE and IBERVILLE were the most noted. Of his other sons we mention the following:

2. CHARLES, BARON DE LONGUEUIL (1656-1729), the eldest, was born at Villemarie. He was surnamed the "Maccabeus of Montreal" on account of his valor. In his youth he served in the French army in Flanders, and afterwards in Canada, where he was made major of Montreal in 1683. In 1690 he became governor of Montreal, and in 1711 he saved the French colony from great danger by negotiating with the Onondaga Indians. He became commandant-general of the

colony in 1711, governor of Three Rivers in 1720, and was governor of Montreal again from 1724 to 1726.

3. JACQUES, SIEUR DE STE. HÉLÈNE (1659-1690), served with his brother Pierre (afterwards Ibergville) in 1686 in De Troye's expedition against the English on Hudson Bay which resulted in the capture of three forts and a war-vessel. In 1690 he shared the command of the force sent to capture Schenectady, when the French plundered and burned this town. In October of the same year he defended Quebec, which was besieged by Admiral Phips, and repulsed the English, but was mortally wounded at the moment of victory.

4. PAUL, SIEUR DE MARICOURT, born at Villemarie in 1663, died there in 1704. He took part in expeditions to Hudson Bay, and had a large share in Ibergville's successes there and also at Quebec. Afterwards he was engaged in Frontenac's expedition against the Iroquois, and negotiated peace with them in 1701, but was killed by them in 1704, after they had adopted him into their tribe, and had begged him to be a mediator between them and the French governor.

5. JOSEPH, SIEUR DE SÉRIGNY, born at Villemarie in 1668, died at Rochefort, France, in 1734. He went to France and commanded a flotilla which was to co-operate with the land forces under his brother Ibergville in taking possession of Hudson Bay. He afterwards conveyed some of the first colonists to Louisiana, surveyed its coast, erected several ports there, drove the Spaniards from Dauphin Island (in Mobile Bay), and assisted in capturing Pensacola. He became captain of a ship of the line in 1720, and in 1723 was made rear-admiral and governor of Rochefort, France.

6. ANTOINE, SIEUR DE CHATEAUGUAY, born at Montreal in 1683, died at Rochefort, France, in 1747. He entered the French army, and arrived at Louisiana in 1704 with a band of colonists. In 1717 he was made commandant of the troops in Louisiana, and in the next year King's lieutenant of the colony and Knight of St. Louis. After assisting in the capture of Pensacola from the Spaniards, in May 1719, he commanded the post, but had to surrender it to them again in August, and was himself made and kept a prisoner of war till July, 1720. He then held command at Mobile until 1726, when he was removed from office and ordered to France. From 1727 to 1745 he was governor successively of Martinique, Cayenne, and Cape Breton, then called Isle Royale.

LEMPRIERE, JOHN, an English scholar, born about 1760, died Feb. 1, 1824. He was educated at Westminster and at Pembroke College, Oxford, took orders in the Church of England, and was in turn head-master of Abingdon and Exeter grammar-schools, and rector of Meath in Devonshire and of Newton-Petrock. His famous *Classical Dictionary* (1792) remained for many years the standard work of reference in England on ancient mythology, biography, and geography. Another work of Lempriere's was *Universal Biography* (1808).

LENA, a post-village of Stephenson county, Ill., on the Illinois Central Railroad, 132 miles northwest of Chicago. It has manufactures of carriages, sash and blinds, and boots and shoes.

LENAU, NICKLAUS, the pen-name of Nikolaus Niembach von Strehlenau, a German poet, born at Czabad in Hungary, Aug. 13, 1802, died Aug. 22, 1850. He studied philosophy, jurisprudence, and medicine at Vienna, visited the United States in 1832, and after his return to Europe lived alternately in Vienna and in Stuttgart. In 1844 he became insane, and passed the remainder of his life in con-

finement. Lenau's poetic power is shown to best advantage in his short lyric effusions, especially those associated with the land of his birth. Of his longer pieces the best are *Faust*, *Savonarola*, and *Die Abtöner*.

LENCZIZA, an ancient Polish town, eighty miles west-southwest of Warsaw. Population, 5,546.

L'ENFANT, PIERRE CHARLES, architect and engineer, born in France in 1755, died in Prince George's county, Md., in 1825. He came to this country with Lafayette in 1777, and entered the Continental army in autumn of that year as an engineer, was in 1778 made captain, and at the siege of Savannah was wounded and left on the field. He afterwards served under the immediate command of Washington, became a major in May, 1783, was employed as engineer at Fort Mifflin (on the Delaware) in 1794, and appointed professor of engineering at the United States Military Academy in July 1812, but declined. L'enfant drew the plan of the city of Washington, D. C., and was the architect of some of its public buildings.

LENORMANT, CHARLES, a French archaeologist, born at Paris in 1802, died at Athens, Greece, in 1859. After studying law he became interested in classical antiquities, and was in 1825 made an inspector of the fine arts. He explored the Egyptian and Greek antiquities in 1828-9, and was in 1830 made chief of the section of fine arts in the ministry of the interior. In 1835 he became professor at the Sorbonne, and in 1848 he was made professor of Egyptology in the Collège de France. He wrote several treatises on ancient art, numismatics, Egyptology and Oriental history.

LENORMANT, FRANÇOIS, a French archaeologist, son of the preceding, born at Paris in 1837, died in 1883. He also studied Oriental archaeology, but in addition he wrote a great deal on the Eastern question of the present day. For ten years he was a librarian of the French Institute. In 1874 he was made professor of archaeology in the National Library. His Assyrian researches, especially on the cuneiform inscriptions are considered of the highest value. He published *Manual of the Ancient History of the East*; *Les Chefs d'œuvre de l'art Antique*; *Histoire du Peuple juif*; *Histoire des Peuples Orientaux*; and *Les Sciences occultes en Asie*.

LEO, XIII., POPE, born at Carpineto, Italy, in 1810, being the son of Count Ludovico Pecci. His baptismal name was Vincenzo Gioacchino. Being educated at the Jesuit College at Viterbo, and afterwards at Rome, he devoted himself assiduously to the study of philosophy and was made an L. L. D. Pope Gregory XVI. made him a domestic prelate in 1837, and in the same year he was ordained priest. He served as apostolic delegate at Benevento, Perugia and Spoleto, and was in 1843 made archbishop of Diametta *in partibus*. In 1853 he was created a cardinal by Pope Pius IX. and in September 1877 he was created Cardinal Camerlingo, that is, chamberlain of the pope. As such he was the head of the church in temporal matters after the death of Pius IX. in February 1878. On the third ballot in the cardinals' conclave he was elected pope and assumed the name of Leo. His scholarly attainments and firm character fitted him well for the high office. His first encyclical, issued in December 1878, summons the intellectual forces of Roman Catholicism against the anarchical tendencies of modern socialism. At every opportunity he tried to conciliate the governments of Europe without abating the assertion of the rights of the church and the papacy. He regards himself as the despoiled sovereign of Rome and as a prisoner in the Vatican. The income voted him by the Italian parliament he refused to accept. It is stated

that he has an income of two and one half millions of dollars a year. This fact sufficiently explains his refusal. Pope Leo has protested against heresy and "godless" schools, and in 1889 issued an allocution against the unveiling of the statue of Giordano Bruno at Rome. He has generally exhibited moderation and foresight in his foreign policy, has opened the archives of the Vatican for historical research and has made himself personally known as a poet in the Latin tongue.

LEOMINSTER, a post-village and a railroad junction of Worcester county, Mass., on the Nashua River. It has manufactories of furniture, horn-goods, forks, linen, woolen, paper, children's carriages, and pianos.

LEON, a post-village, the county-seat of Decatur county, Iowa, situated twenty-one miles south of Osceola.

LEONFORTE, a walled Sicilian town, forty-nine miles by rail west by north of Catania. Population, 15,645.

LEONINE VERSES, irregular forms of Latin verse which arose in the middle ages under the influence of the minstrels. The name specially applies to verses rhymed as well as accentual, and more especially to groups of alternate hexameter and pentameter verses, rhymed at the middle and end. They owe their name to Leoninus, a canon of the church of St. Victor, in Paris, about the middle of the 12th century, or as others say, to Pope Leo II., who was a lover and improver of music.

LEPIDODENDRON, a genus of fossil plants which occurs in Carboniferous and Upper Devonian strata. Several species are recognized, most of which are from 40 to 50 feet long and more than 4 feet in diameter. They were tree-like lycopods, their living representatives being the low-growing club-mosses of our mountains. The stem was either covered with linear one-nerved leaves, or where these had fallen was marked with ovate or lozenge-shaped leaf-scars, arranged in a spiral manner. The fruits were elongated cylindrical bodies, composed of a conical axis, around which a great quantity of scales were compactly imbricated. The fossils described under the name *Knorria* are now known to be the decorticated stems of *Lepidodendron*.

LEPISMA, a genus of wingless insects, of the order *Thysanura*. All the species of *Lepisma* and of the family *Lepismatidae* inhabit moist places, and feed on decaying vegetable substances. They have a flattened spindle-shaped body, terminating in three long bristles, and they run swiftly. See *Britannica*, Vol. XIII, pp. 153, 154.

LEPORIDE, a variety of the domesticated rabbit, also known as the Belgian hare. See *RABBIT*, *Britannica*, Vol. XX, p. 193.

LEPSIUS, KARL RICHARD, a German Egyptologist, born at Naumburg in 1810, died in 1884. After studying at the University of Leipzig, Göttingen, and Berlin, he gained his doctor diploma in 1833 with an essay on the Eugubine Tables. In 1834, at Paris, he gained the Volney prize by his essay on *Paleographie als Mittel der Sprachforschung*. After devoting himself considerably to Egyptian studies at Rome, he made historical researches from 1842 to 1845 in Lower and Upper Egypt and brought a valuable archaeological collection home to Berlin, where he was professor for some years. In 1866 he explored the delta of the Nile. In 1874 he was made chief of the Prussian State Library at Berlin. He wrote in German and English a *Universal Standard Alphabet*; *Chronologie der Ägypter*; and *Die Denkmäler aus Ägypten und Äthiopien* (1849-1859), and many other works.

LEPTOSPERMUM, a genus of trees and shrubs, natives of Australia and New Zealand, of the natural order *Myrtaceæ*, sub-order *Leptospermeæ*. They are evergreen, with leaves somewhat resembling those of myrtles. Some of them bear the name of Tea-tree, because the leaves have been used as a substitute for tea. *L. Scoparium* is sometimes called the New Zealand Tea-plant.

LERCARA DI FREDDI, a town of Sicily, in the province of Palermo, 30 miles from the town of Palermo. Most of the inhabitants are employed in the sulphur mines of the vicinity. Population, 9,154.

LERICI, a maritime town of Italy, province of Genoa, on the Bay of Spezia, five miles from La Spezia. It is defended by a castle, and has a Capuchin monastery, the buildings of an old Augustinian monastery, several palaces, a hospital and a harbor, which is frequented by coasting-vessels. The fishery employs a great number of the inhabitants. Population, 5,940.

LERNAÏDÆ, a family of Copepod crustaceans, of which the females are parasitic on fishes and grotesquely degenerate, the adults showing hardly a trace of crustacean structure.

LE ROY, a post-village and railroad junction of Genesee county, N. Y., ten miles east of Batavia, and 52 miles east of Buffalo. It has the Le Roy Academic Institute, the Ingham University for Ladies, an art conservatory and a public library.

LESION, a term in civil law to denote injury or prejudice sustained by a minor or by a person of weak capacity, sufficient to be a ground of action to reduce or set aside the deed which caused the lesion.

LESLEY, JOHN PETER, an American geologist, born at Philadelphia in 1819. He graduated at the University of Pennsylvania in 1838, and during the three following years served as assistant on the geological survey of Pennsylvania. From 1841 till 1845 he studied theology at Princeton, N. J., and at the University of Halle, Germany. Then he became missionary to the Germans in Pennsylvania till 1847, and preached for three years in the Congregational church at Wilton, Mass. But here his theological views underwent a change, in consequence of which he left the pulpit and settled in Philadelphia, where he has since been engaged as a professional expert in geology. In 1872 he was appointed professor of geology and mining, and also dean of the scientific faculty in the University of Pennsylvania. His geological work has included numerous special examinations of coal oil, and iron fields in the United States and Canada. In 1874 he was made chief geologist of Pennsylvania, with charge of a complete re-survey of the State. Besides publishing some 70 volumes of geological reports, he published a *Manual of Coal and its Topography*; *The Iron Manufacturers' Guide*, and *Men's Origin and Destiny as Seen from the Platform of the Sciences* (1868; revised 1887).

LESLIE, a post-village of Ingham county, Mich., on the Jackson, Lansing & Saginaw Railroad, 24 miles from Lansing. It has stove-works, steam-mills, iron-foundry and eight magnetic artesian wells.

LESSEPS, FERDINAND MARIE, VISCOUNT DE, a French engineer, born at Versailles in 1805. At the age of 24 he entered the French diplomatic service as attaché at Lisbon, and subsequently held consular appointments at Barcelona, Tunis, and Alexandria. In 1841, while detained in quarantine at Port Said, his great project of cutting a canal through the Isthmus of Suez dawned upon him. During his eight years' subsequent residence in Egypt he dreamed over this scheme; but it was

not until Said Pasha acceded to power in 1854 that the project received practical support; Said Pasha issued a firman sanctioning the enterprise, granted a letter of concession in 1856, and took a large number of shares. After many difficulties De Lesseps formed a company in Paris in 1858. The first sod of the canal was turned in the spring of 1859, and on Nov. 17, 1869, the completed canal was formally opened amid festivities at Port Said. De Lesseps was created a K. C. S. I. by Queen Victoria, and received the honorary freedom of the city of London.

Since 1873 he has concentrated his energy on the Panama Canal. In 1874 this project was vigorously agitated by the French press. In 1876 De Lesseps formed a company for making preliminary surveys, and in 1879 he obtained from the Colombian government the exclusive privilege of constructing a canal between the two oceans through the Colombian territory. When he first opened subscription lists, all the capital was subscribed which he then thought necessary. The Inter-Oceanic Canal Company was definitely constituted Jan. 31, 1881, and the work commenced in October of the same year. Much money has since been wasted in this enterprise, and De Lesseps had to ask for new loans repeatedly. The *Crédit Foncier* was ready to furnish all the funds required for finishing the canal, provided that the French government should guarantee the loans, but when the United States government demanded that the French government should not guarantee the enterprise officially, no further funds could be raised, and the enterprise collapsed for want of the 1,700 millions of francs found yet to be necessary.

LESSING, KARL FRIEDRICH, a German painter, the grand-nephew of the famous poet, G. E. Lessing, born at Wartenburg, Silesia, in 1808, died in 1880. After studying under F. W. Schadow at Berlin he painted *The Battle of Icnium*; *A Hussite Sermon*, followed by *Huss Before the Council of Constance*, and *The Martyrdom of Huss*. The Germans criticized him for selecting Bohemian instead of German subjects. Lessing also worked conscientiously as a painter of landscapes, and produced among many other pieces, *The Oaks of a Thousand Years*, and the famous *Cloister in the Snow*.

LESTRIDINÆ, a sub-family of *Laridæ*, distinguished by a well-developed beak, the upper mandible being saddled with a sort of cere underneath, which the nostrils open. In this group are embraced the jagers, or gull-hunters, so called because they chiefly obtain their food by attacking gulls and terns and compelling them to disgorge or defecate; the food thus dropped they appropriate to themselves. The species are few, chiefly inhabiting the sea-coasts of the northern hemisphere.

LE SUEUR, a post-village of Le Sueur county, Minn., situated on the Minnesota River, and on the St. Paul & Sioux City Railroad, 63 miles from St. Paul. It has a graded school and manufactories of flour, woolen goods and wagons.

LESUEUR, EUSTACHE, a French painter, born in Paris in 1617, died there in 1655. He received his first artistic instruction from his father, and afterwards studied under Simon Vouet, but never visited Italy. The Louvre possesses 36 religious pictures by him, and 13 mythological, the former including his great series of 20 paintings illustrating the life of St. Bruno, and his *St. Paul at Ephesus*. His genius possessed an originality which still charms in his pictures.

LETHAL WEAPON: in criminal law, a weapon by which death was caused, as a sword, knife or pistol.

LETTERS. For Letters of Credit, see **CREDIT**; for Letters of Administration, see **LETTERS TESTAMENTARY**; for Letters Patent, see **PATENTS**, in these Revisions and Additions.

LETTERS ROGATORY, an instrument sent by the judge or court of one State or country to the tribunal of another State or country requesting that the deposition of a witness living within the jurisdiction of the latter be taken for the furtherance of justice, usually adding to the request an offer to perform a similar service for the foreign tribunal whenever required.

LETTERS TESTAMENTARY, the instrument granted by a court of probate empowering an executor to administer an estate. When a person dies intestate a similar instrument is granted to the person who is appointed administrator, but it is then called Letters of Administration.

LETTER-WOOD. See **BREAD-NUT**, in these Revisions and Additions.

LEUCKART, KARL RUDOLF, a German zoölogist, born at Helmstädt, Oct. 7, 1823, studied at Göttingen, in 1850 became professor of zoölogy at Giessen, and in 1869 at Leipzig. He has especially distinguished himself by his study of the Entozoa. His great work is *The Parasites of Man* (English translation by Hoyle, 1886).

LEUCOMA, the term applied to a white opacity of the cornea. It is the result of acute inflammation, giving rise to the formation of cicatricial tissue on the ulcerated surface, or between the layers of the cornea. It is sometimes re-absorbed on the cessation of the inflammation, and the cornea recovers its transparency; but in many cases it is persistent and incurable.

LEUTZE, EMMANUEL, an American painter, born at Gmünd, Würtemberg, in 1816, died at Washington, D. C., in 1868. His parents brought him to Philadelphia in his infancy. He first attempted drawing while attending his father's sick-bed, and soon became skillful. In 1840 he painted an *Indian Gazing at the Setting Sun* with such success that he received many orders for similar work, and became able to go, in 1841, to Düsseldorf, where he studied under K. F. Lessing. There, and later in America, he produced historical paintings connected with American history; notably, *Columbus Before the Council of Salamanca*, *Columbus in Chains*, and *Columbus Before the Queen*; *Washington Crossing the Delaware*; *Washington at Monmouth*; *Storming of Teocalli*; *Settlement of Maryland by Lord Baltimore*. One of his latest pictures is *Western Emigration*, which was painted for the stair-case of the capitol at Washington.

LEUZE, a town in Belgium, in the province of Hainault, on the right bank of the Dender. Dyeing, bleaching, and brewing are actively carried on; also salt-refining and the expressing of oil. Woolen and cotton hosiery and lace are manufactured. Population, 6,000.

LEVEE in the United States, an embankment to prevent inundation, especially on the Mississippi River. See *Britannica*, Vol. XVI, p. 521.

LEVERET, the young of the hare during the first year of its age.

LEVI, LEONE, born at Ancona, Italy, of Jewish parents, July 6, 1821, died May 7, 1888. He settled in Liverpool in 1844, and was one of the founders of the Liverpool Chamber of Commerce. In 1852 he became professor of the principles and practice of commerce in King's College, London. Among his works are *Commercial Law of the World*; *History of British Commerce*; *War and Its Consequences*, and *International Law*.

LEVICO, a town of the Tyrol, Austrian Empire, nine miles from Trent, near the Lake of Levico.

Mulberry trees are here cultivated, and much silk is manufactured. Population, 4,342.

LEVIRATE the institution of marriage between a man and the widow of his brother or nearest kinsman. See *Britannica*, Vol. XXI, p. 111. This custom, common among the ancient Hebrews, was perpetuated by the Mosaic law. It is now practically obsolete among the Jews. A similar custom prevails in parts of India.

LEVITES. The Levites, or sons of Levi, were among the ancient Jews the assistants and servants of the priests, who themselves were the sons of Aaron through Zadok and Eleazar. When the author of the epistle to the Hebrews speaks of a Levitical priesthood (Heb. vii:11) he means the sons of Aaron served by the Levites. According to Ezekiel all those Levites that had served as priests of the high places were degraded from the priestly office (Ezek. xlv: 10-14). See *Britannica*, Vol. XIV, pp. 487-89.

LEWALD, FANNY, German novelist, born of Jewish parents at Königsberg, March 24, 1811, died at Dresden, Aug. 5, 1889. She began to write when about thirty, and from 1840 lived in Berlin; in 1855 she married Adolph Stahr (1805-76), the literary critic. At different times she visited many parts of Europe with her father and her husband. Her books on Italy (1847) and Great Britain (1852) were the most valuable outcome of these journeys. Her best book is perhaps *Von Geschlecht zu Geschlecht* (1863-65).

LEWES, a post-village of Sussex county, Del., on Delaware Bay, directly in front of the Delaware breakwater. It has a good harbor formed by the breakwater. Fishing, farming, and wrecking are the chief pursuits. Population, including Rehoboth (in 1880), 3,103.

LEWIS, EDMONIA, an American sculptor, born near Albany, N. Y., in 1845, of mixed African and Indian blood, and educated at Oberlin, Ohio. She early began to model in clay. Her first work was a bust of Col. R. G. Shaw, who commanded the first United States colored regiment in the National service. In 1865 she went to Rome, where she studied her art, and where she has since remained. Her works show considerable talent. Among them are: *The Freed Woman*; *Death of Cleopatra*, a vividly realistic work; *The Old Arrow-maker and his Daughter*; *Hagar*; *Rebecca at the Well*, and *The Marriage of Hiawatha*.

LEWIS, DIO, born in New York State in 1823; died in 1886. He studied and practiced medicine and became conspicuous as a lecturer on hygiene and temperance.

LEWIS, JOHN TRAVERS, D.D., LL.D., bishop of Ontario, born June 20, 1825, was educated at Trinity College, Dublin, where he graduated as senior moderator in ethics and logic, and was gold medalist. He was ordained in 1848, and held the curacy of Newtown-Butler; came to Canada in 1850, and was appointed to the pastoral charge of the parish of Hawkesbury, which he exchanged in 1854 for the rectory of Brookville. He was consecrated first bishop of Ontario, March 25, 1862.

LEWIS, JOSEPH, D.D., bishop of Llandaff, born about 1822; was educated at Worcester College, Oxford (B. A., 1843; M. A., 1846). He was collated to the rectory of Lampeter-Velfry, Narberth, Pembrokeshire, in 1851, and was appointed arch-deacon of St. David's in 1875. In 1883 he was appointed bishop of Llandaff in succession to Doctor Ollivant, and was consecrated to that see by the archbishop of Canterbury on April 25.

LEWIS, MORGAN, an American general and statesman, born at New York, Oct. 16, 1764, died there, April 7, 1844. While engaged in studying law he joined the Continental army, in 1774. In 1786 he

was aide to Gen. Gates with rank of colonel, fought at Saratoga in 1777, and in 1778 at the battles of Stone Arabia and Crown Point. After the war he was made attorney-general of New York, in 1791, and a judge of the Supreme Court in 1792. In 1804 he was elected governor of New York, but in 1807 he returned to the practice of law. In 1812 President Madison made him quartermaster-general of the United States army, and in the next year Lewis was promoted to the rank of major-general. He served at Niagara, and afterwards took charge of the defence of New York. At the close of the war he advanced the funds that were necessary for the discharge of the American prisoners in Canada. He afterwards devoted himself to agriculture, serving also as president of the New York Historical Society, and grand-master of the order of Free Masons.

LEWIS, TAYLER, an American author, born at Northumberland, N. Y., in 1802, died at Schenectady, in 1877. He practiced law at Fort Miller, N. Y., till 1833, when he opened a classical school at Waterford, N. Y. In 1838 he became professor of Greek in the University of New York, and from 1849 till his death he was professor of Greek, instructor in Oriental languages, and lecturer on Biblical and Oriental literature at Union College, Schenectady. Among his works are: *Plato Against the Atheists*; *The Six Days of Creation*, which maintains the harmony of the Bible and geology; *The Bible and Science*; *The Divine Human in the Scriptures*; *States Rights*; *A Photograph of the Ruins of Ancient Greece*; *The Light by which we See Light*; *The People of Africa, Their Character, Condition, and Future Prospects*.

LEWISIA, a genus of plants of the natural order *Portulacaceae*, named in honor of the American traveler, Meriwether Lewis (1774-1809). *L. rediviva* is found in the regions of his explorations, on the west side of the Rocky Mountains. It has a showy rose-colored flower.

LEWISBURG, a town, the county-seat of Union county, Pa., on the west branch of the Susquehanna River. It is a grain-shipping point, is the seat of Bucknell University and contains a boat-yard, iron works, woolen factory, and a manufactory for farming tools. Population, 3,205.

LEWISBURG, a post-village, the county-seat of Greenbrier county, W. Va., in a "blue-grass" region, nine miles from White Sulphur Springs.

LEWISTON, a post-village, the former capital of Idaho and now the county-seat of Nez Percés county, situated at the confluence of the Clearwater and Snake rivers, at the head of steamboat navigation.

LEWISTON, a city of Androscoggin county, Me., on the east bank of the Androscoggin River, thirty-five miles north of Portland. It is the second city of the State in population, and an important railroad center. The river has here a fall of 50 feet, and by means of a stone dam affords an excellent water-power. The Androscoggin is crossed here by two iron railroad bridges and two wagon bridges. Lewiston is the seat of Bates' College, a Free-will Baptist institution. The most important manufactures are those of cotton and woolen goods, machinery, boots and shoes, jute bags, grain sacks, and brushes. The mills which manufacture these goods are worked by water-power, the water being conveyed to the mills by a canal. Lewiston was incorporated in 1795 and chartered as a city in 1861. Population, 21,668. See Britannica, Vol. XIV, p. 494.

LEWISTOWN, a post-village, the county-seat of Fulton county, Ill., sixty miles northwest of Springfield. It has woolen, carriage, wagon, plow, spoke, and hub factories. Population (in 1880), 1,771.

LEWISTOWN, a town, the county-seat of Mifflin county, Pa., at the mouth of Kishacoquillas Creek, on the Juniata River and on two railroads. It has flour-mills, furnaces, ax-factories, steel-works, and is noted as a shipping-point for iron, coal, and grain. The surrounding mountain scenery attracts many summer visitors. Population, 3,288.

LEXINGTON, a post-village of McLean county, Ill., on the Chicago & Alton Railroad, one hundred and eleven miles south of Chicago. It is largely engaged in stock-raising and farming. The village has several lodges of Patrons of Husbandry.

LEXINGTON, a city, the county-seat of Fayette county, Ky., the largest city of the blue grass region. It is seventy-seven miles south of Cincinnati. The Kentucky Central, Chesapeake & Ohio, the Cincinnati Southern, and the Louisville & Nashville railroads center here. Lexington is the seat of the Kentucky University and of the State Insane Asylum. The city has large flouring-mills, distilleries, copper works, a hemp manufactory, etc., and is the center of an extensive trade in native tobacco. The Henry Clay monument is one of the ornaments of the town. Population, 22,355. See Britannica, Vol. XIV, p. 494.

LEXINGTON, a small village of Middlesex county, Mass., eleven miles northwest of Boston, containing a monument erected to commemorate the patriotism of those who fell in the first battle of the Revolution. See BATTLE OF LEXINGTON, Britannica, Vol. XXIII, p. 740.

LEXINGTON, a city, a railroad center, and the county-seat of La Fayette county, Mo., on the south bank of the Missouri, situated on a bluff 300 feet above the river. It has great commercial prosperity, has a wide strata of excellent coal underlying the town, is the center of a hemp-growing region, and is noted for having been thrice besieged during the civil war—September, 1861; October, 1861, and October, 1864. Population, 4,538. See Britannica, Vol. XIV, p. 494.

LEXINGTON, the county-seat of Rockbridge county, Va., situated in the fertile valley bounded on the southeast by the Blue Ridge, and known as the "Valley of Virginia." It is the western terminus of the James River and Kanawha Canal; has immense water-power, and contains flour-mills and a foundry. It is near the Natural Bridge and the Peaks of Otter; is the seat of Washington and Lee University and of the Virginia Military Institute, and is the burial-place of Robert E. Lee and "Stonewall" Jackson. See Britannica, Vol. XIV, p. 494.

LEX NON SCRIPTA, the unwritten law, an expression often applied to the common law or immemorial custom.

LEX TALIONIS, the law of retaliation, common among all ancient and barbarous nations, by which "an eye for an eye and a tooth for a tooth" was considered the appropriate punishment.

LEYS, HENRY JEAN AUGUSTE, a Belgian painter, born Feb. 18, 1815, at Antwerp, in which city most of his life was spent, and where he died Aug. 26, 1869. At the age of fifteen he entered the studio of Brakeleer, and subsequently traveled and studied in France and Holland. He was created baron by Leopold I. in 1862. Leys was one of the best modern artists in the style of the old Flemish masters. Among his most valuable and most characteristic pictures are: *Rembrandt's Studio*; *A Flemish Wedding*; *A Village Fête*; *New Year's Day in Flanders*; and *Luther Singing in the Streets of Eisenach*.

LIANA, a term first used in the French colonies and afterwards adopted by English, German, and other travelers, to designate the woody, climbing, and twining plants which abound in tropical forests, often rendering great areas of land quite im-

penetrable. Botanically considered, lianas belong to a number of different natural orders. Some of them become tree-like in the thickness of their stems, and frequently kill by constriction the trees which originally supported them. No tropical flowers excel in splendor those of some lianas. Among them also are found some valuable medicinal plants.

LIBEL, an injurious attack upon a man's reputation or character by written or printed words or signs. Slander refers to the same injury by spoken words. The United States received the law of libel from England without material change, except the limiting of the liability for published communications in some of the States. Some of our State constitutions declare that every citizen shall have unrestricted liberty to speak, write, and publish his sentiments on all subjects; and that in prosecutions for libel the truth of his assertions may be given in evidence, and shall be a defense if published with good motives and for justifiable ends. If in any State this privilege is not declared by the constitution it is held to be a part of its common law; so that the right to defend against a charge of libel, by showing that the publication was truthful and was made for justifiable ends, may be said to be guaranteed in all of the United States.

But there are cases in which the good motive alone may be a defense, though the published statements may be untrue. Such cases are known as "privileged" ones. If, for instance, an attorney under the instruction of his client incorporates in legal proceedings defamatory statements in regard to an opposing party for the purposes of judicial investigation, such statements are privileged. They may afterwards be proven untrue as well as injurious. Yet the attorney cannot be made liable for them, if the allegations were pertinent to the case in hand. Another common case occurs when proceedings taking place in courts are published, provided that the proceedings are not *ex parte*, but such that both parties have the opportunity to present the facts, and provided also that the publication is impartial and fair. If, however, the proceedings are *ex parte*, the publisher must, at his peril, ascertain what the facts are, before he repeats injurious *ex parte* charges, even though they be made in court.

Another privileged case is that of legislators. Outside the legislative halls and committee rooms a legislator cannot be called to account for what he has said in debate. This right is expressly guaranteed by most of the State constitutions. It certainly applies also to papers drawn up or used in the pursuance of legislative duties.

The question how far the publication of speeches made in Congress or in the State legislatures is privileged has never been decided in court. But in our opinion the decision cannot be doubtful at all. In all our legislative bodies provision has been made by law for the complete publication by a State printer of their regular proceedings, and this publication in the case of Congress embraces a complete presentation of all that is said in its open sessions. Now it would be unfair, to say the least, to hold the public printer pecuniarily responsible in case a speech published by him correctly contains false statements that effect some person injuriously. It is, of course, different if the published proceedings are one-sided, partial, or garbled.

A very common case in which the privilege is qualified by motive is that of criticising the character and conduct of candidates for public offices or of present incumbents of such offices. The writer who would call the latter to account, or defeat the aspirations of the former, may publish all he knows that has a bearing on the subject; he may even publish also what he believes, provided he has suf-

ficient reasons for believing and is not negligent in ascertaining the true facts. Under such circumstances his mistakes of fact will not render him liable as long as he can justify his motives. This does not excuse general abuse and vilification. What he publishes must have an obvious tendency, if true, to accomplish the end at which he professes to aim. If, for instance, a candidate for a public trusteeship has a grown son who is known to a newspaper editor as a thorough-going gambler, swindler, and spendthrift, it will be proper for such writer to inform his readers, if they are voters, of this fact. The public may judge of the father by the character of his son. The father's suit for damages in such a case will not be apt to prove successful, if the editor has been careful not to attack the candidate's character with direct and positive assertions that are not verifiable.

If a publication that might otherwise be privileged can be shown to be blasphemous, indecent, or otherwise unfit for the reading public, the publishing of it may be a public offense in spite of the general privilege, and for this reason it would not be permissible. Such questions have come up in connection with the criticism of nude works of art, as statuary and pictures of mythological scenes. On the other hand, art criticism has also been made the means for attacking artists and authors by the press. J. Fenimore Cooper brought suits against Thurlow Weed, J. Watson Webb, Horace Greeley, W. L. Stone, and several other editors of New York papers, for adverse criticisms of his published works. His complaint was that they were not fair criticisms of his works, but were aimed rather at the author than at his writings. He recovered damages in most cases, especially against Thurlow Weed, against whom he brought numerous distinct suits, until Weed published in 1842 a sweeping retraction of all that he had ever printed derogatory to Cooper's character. The court held that, although fair criticism of works offered to the public by the author is fully privileged, yet this privilege must not be made a cover for attacks upon the author's character or reputation. See *Britannica*, Vol. XIV, pp. 505-7.

LIBERIA, REPUBLIC OF. For general article on LIBERIA, see *Britannica*, Vol. XIV, pp. 508, 509. The latest accredited reports estimate the area at about 14,300 square miles; and the population (colored) at 1,068,000, including about 18,000 civilized American-Liberian colored citizens. Capital, Monrovia, with a population of 3,400. The other chief towns are Edma, population, 5,000; Harper, population, 3,000; and Buchanan, population, 1,200.

The revenue in 1884 was \$175,000, and expenditures, \$165,000. The revenue is derived chiefly from customs duties. The public debt, created in 1871 by a loan in England, with accrued interest (7 per cent.) is about \$1,000,000.

The constitution of Liberia is modeled after that of the United States. The president and house of representatives are elected for two years, and the senate for four years. There are now eight senators and thirteen representatives. The president of the Republic must be thirty-five or more years of age, and must have property to the value of \$600. His cabinet consists of five ministers, viz., secretaries of state, treasurer, and interior, and attorney-general, and post-master general. At present (1891) Hilary R. W. Johnson (first elected in 1883, assuming office 1883, and since successively re-elected) is the president.

LIBERTY, a post-village, the capital of Union county, Ind., situated on the Cincinnati, Hamilton & Indianapolis Railroad, fifty miles northwest of Cincinnati, Ohio. It has large flouring-mills, a

manufactory of agricultural-implements, planing-mills, etc. The principal business in the vicinity is farming and stock-raising.

LIBERTY, a post-town, the county-seat of Clay county, Mo., sixteen miles northeast of Kansas City. It is the seat of William Jewell College (Baptist). Population (1880), 1,476.

LIBERTY, a post-village, the county-seat of Bedford county, Va., on the Atlantic, Mississippi & Ohio Railroad, twenty-five miles west of Lynchburg. It has tobacco factories and warehouses, and is situated near the celebrated peaks of Alter, which are said to rival the White mountains in sublimity.

LIBERTY, EQUALITY, FRATERNITY (*Liberté, Égalité, Fraternité*), the motto of the French Republic, dating from the time of the first revolution. Equality merely means equality before the law and the absence of class privileges.

LIBOCEDRUS, a genus of coniferous trees, closely related to *Thuja*, the arbor-vitæ. The eight known species are natives of California, Chili, New Zealand, China and Japan. *L. Decurrens*, the California species, is known as "white cedar." It is a beautiful tree, attaining a height of 120 to 200 feet with a trunk 6 or 7 feet in diameter, and has a light, soft, durable wood.

LIBRARIES.

LIBRARIES, UNITED STATES. According to the lists of libraries published in the latest report of the United States Commissioner of Education there are now 3,300 libraries containing 1,000 or more volumes in the United States. Some of these libraries have been started and are maintained by subscription; others by private endowments, as the Astor Library in New York, and the libraries of many of our colleges. Still others are the property of the State or municipal governments, there being now a State library in every State of the Union, in order to facilitate an annual exchange of statutes for the use of the executive, legislative and judicial departments of each State government. The library of the State of New York is the largest and most complete of the State libraries. The libraries of the United States government are in the accompanying list under "District of Columbia, Washington."

The scientific branches represented in these libraries are in accord with the pursuits of their intended readers. Free public libraries comprise subjects of the most varied and divergent character, because they are calculated to supply the needs of the public at large. Law libraries and State libraries are more or less restricted to books relating to law matters, politics, public institutions, etc. Medical and theological libraries, school libraries, etc., contain mostly books treating on the particular branches taught in the schools with which they are connected. In the following list we give the place, name and number of volumes of all the libraries in the United States which contain 10,000 volumes and upwards. This list is taken from the "Library Journal" of January, 1887 and 1889, and harmonizes with the last published report of the United States Commissioner of Education:

Place.	Name of Library.	Founded.	Number of Volumes.
<i>Alabama:</i>			
Montgomery.....	State and Supreme Court.....	1898	17,626
Spring Hill.....	College.....	1829	12,000
<i>Arkansas:</i>			
Little Rock.....	State.....	1846	20,000
<i>California:</i>			
Berkeley.....	University of California.....	1869	26,773
Oakland.....	Free Public.....	1868	10,738
Sacramento.....	Free Public.....	1879	11,778
State.....	State.....	1890	61,612
San Francisco.....	Bancroft Pacific.....	1869	45,000

Place.	Name of Library.	Founded.	Number of Volumes.
<i>San Francisco:</i>			
California Academy of Sciences.....	1853	10,000	
Free Public.....	1879	65,000	
French Ligue Nationale.....	1875	13,000	
Law.....	1867	25,500	
Mechanics' Institute.....	1855	40,000	
Mercantile.....	1863	55,000	
Odd Fellows.....	1854	40,131	
St. Ignatius College.....	1856	12,000	
Sutro.....	1887	110,000	
Theological Seminary.....	1871	16,000	
Santa Clara.....	Santa Clara College.....	1851	12,000
<i>Colorado:</i>			
Mercantile.....	Mercantile.....	1886	10,508
<i>Connecticut:</i>			
Bridgeport.....	Public.....	1882	16,550
Hartford.....	Connecticut Historical Society.....	1825	21,000
Hartford Library Association.....	1883	36,500	
Theological Seminary.....	1884	42,000	
State.....	1854	15,000	
Trinity College.....	1824	26,000	
Watkinson Library of Reference.....	1858	40,000	
Middletown.....	Berkeley Divinity School.....	1855	17,387
Wesleyan University.....	1883	38,690	
New Haven.....	Yale College.....	1700	125,000
Linonian & Brothers.....	1769	28,000	
Young Men's Institute.....	1826	12,000	
Norwich.....	Otis.....	1850	15,640
Waterbury.....	Silas Bronson.....	1870	86,500
<i>Delaware:</i>			
Dover.....	State.....	1832	15,000
Wilmington.....	Wilmington Institute.....	1787	15,632
<i>District of Columbia:</i>			
Washington.....	Bureau of Education.....	1868	17,500
Department of Agriculture.....	1868	18,000	
Department of Justice.....	1863	20,000	
Department of State.....	1789	22,625	
Georgetown College.....	1791	35,000	
Gonzaga College.....	1869	10,000	
House of Representatives.....	1789	125,000	
Howard University.....	1862	11,509	
Library of Congress.....	1802	565,134	
Navy Department.....	1878	17,000	
Patent Office.....	1839	50,000	
Signal Office U. S. Army.....	1861	10,540	
Surgeon General's Office.....	1865	76,733	
Treasury Department.....	1808	18,000	
U. S. Geological Survey.....	1862	17,255	
U. S. Naval Observatory.....	1845	12,000	
U. S. Senate.....	1852	30,000	
War Department.....	1832	17,500	
<i>Florida:</i>			
Tallahassee.....	State.....	1845	12,500

Place.	Name of Library.	Founded.	Number of Volumes.	Place.	Name of Library.	Founded.	Number of Volumes.
<i>Georgia:</i>				<i>Maryland:</i>			
Athens.....	University of Georgia.....	1800	16,000	Annapolis.....	Naval Academy.....	1845	26,893
Atlanta.....	State.....	1825	45,000	Baltimore.....	State.....	1825	75,000
	Young Men's Library Association.....	1887	11,343		Archiepiscopal.....		15,000
Macon.....	Public Library and Historical Society.....	1840	10,000		Baltimore Bar Library Com- pany.....	1840	10,000
Newnan.....	College Temple.....	1874	10,300		Enoch Pratt Free.....	1887	40,888
Savannah.....	Georgia Historical Society.....	1839	15,250		Johns Hopkins University.....	1876	26,500
<i>Illinois:</i>					Loyola College.....	1853	12,000
Chicago.....	Baptist Union Theological Seminary.....	1869	20,000		Maryland Historical Society.....	1844	20,000
	Chicago Historical Society.....	1856	12,024		Maryland Institute.....	1847	20,515
	Law Institute.....	1857	19,000		Mercantile Library Associa- tion.....	1839	40,000
	Public.....	1872	19,570		Odd Fellows'.....	1840	21,952
	St. Ignatius College.....	1870	14,000		Peabody Institute.....	1857	88,000
Evanston.....	Northwestern University.....	1856	26,000		St. Mary's Theological Semi- nary.....	1791	26,000
Galesburg.....	Public.....	1874	12,571	Ilchester.....	Mount St. Clement College.....	1868	10,000
Joliet.....	Joliet Business College.....	1866	11,000	Woodstock.....	Woodstock College.....	1869	67,000
Monmouth.....	Warren County.....	1870	11,196	<i>Massachusetts:</i>			
Morgan Park.....	Baptist Theological Seminary.....	1867	25,000	Amherst.....	Amherst College.....	1821	45,186
Mount Morris.....	Cassell Library of Mt. Morris College.....	1880	12,000	Andover.....	Theological seminary.....	1807	40,888
Peoria.....	Public.....	1880	25,350	Beverly.....	Public.....	1855	10,624
Rockford.....	Public.....	1872	13,100	Boston.....	American Academy of Arts and Sciences.....	1780	18,000
Springfield.....	State.....	1818	40,000		Athenaeum.....	1807	150,261
Urbana.....	University of Illinois.....	1868	15,539		Boston College.....	1864	12,000
<i>Indiana:</i>					Congregational.....	1836	25,450
Crawfordsville.....	Wabash College.....	1833	22,053		General Theological.....	1840	15,000
Evansville.....	Willard Library.....	1885	10,000		Library Society.....	1792	26,000
Greencastle.....	De Pauw University.....	1837	15,450		Massachusetts Historical So- ciety.....	1791	31,000
Indianapolis.....	Public.....	1872	39,590		Medical Library Association.....	1875	15,000
	State.....	1825	23,000		New England Historic-Genea- logical Society.....	1845	20,778
Notre Dame.....	University of Lemonnier.....	1867	14,500		Public.....	1852	434,857
Richmond.....	Morrison.....	1843	28,000		Social Law.....	1804	30,000
St. Meinrad.....	St. Meinrad's Abbey.....	1854	11,500		Society of Natural History.....	1831	80,000
<i>Iowa:</i>					State.....	1826	60,000
Cedar Rapids.....	Iowa Masonic.....	1844	10,000	Brockton.....	Public.....	1867	10,341
Davenport.....	Academy of Natural Sciences.....	1867	10,000	Brookline.....	Public.....	1857	30,842
	Davenport Library Associa- tion.....	1866	10,500	Cambridge.....	Harvard College.....	1638	232,800
Des Moines.....	State.....	1838	22,554		Harvard Divinity School.....	1825	17,400
Dubuque.....	Young Men's Library Associa- tion.....	1866	13,000		Harvard Law School.....	1817	21,600
Grinnell.....	Iowa College.....	1848	10,000		Museum of Comparative Zo- ology.....	1858	17,600
Iowa City.....	Iowa Historical Society.....	1857	11,000		Porcellian Club.....	1803	10,000
	State University.....	1860	18,873		Public.....	1856	18,000
<i>Kansas:</i>				Clinton.....	Disclow Free Public.....	1873	13,000
Topeka.....	Kansas Historical Society.....	1875	24,121	College Hill.....	Free Public.....	1854	20,104
	State.....	1857	23,988	Concord.....	Free Public.....	1837	19,443
<i>Kentucky:</i>				Danvers.....	Peabody Institute.....	1837	12,000
Danville.....	Danville Theological Semi- nary.....	1858	10,000	Fall River.....	Public.....	1850	30,000
Frankfort.....	State.....	1821	33,900	Fitchburg.....	Public.....	1830	17,000
Lexington.....	Kentucky University.....	1799	13,163	Frammingham.....	Town.....	1855	12,000
Louisville.....	Lexington.....	1800	15,000	Holyoke.....	Public.....	1871	39,268
	Louisville Library Association Polytechnic Society of Ken- tucky.....	1871	10,000	Ipswich.....	Free Public.....	1870	11,000
		1876	40,583	Lancaster.....	Town.....	1803	10,000
<i>Louisiana:</i>				Lawrence.....	Free Public.....	1872	27,322
Baton Rouge.....	State University.....	1861	18,805	Leominster.....	Free Public.....	1856	10,800
New Orleans.....	Louisiana Memorial.....	1888	10,000	Lexington.....	Cary.....	1868	10,000
	Louisiana State.....	1855	21,000	Lowell.....	City.....	1844	30,000
	New Orleans Law Association.....	1843	17,000		Middlesex Mechanics' Associ- ation.....	1825	20,000
	Public School and Lyceum.....	1844	17,000	Lynn.....	Free Public.....	1863	31,400
	Tulane University.....	1884	13,400	Malden.....	Public.....	1879	10,734
<i>Maine:</i>				Medford.....	Public.....	1856	10,200
Augusta.....	State.....	1832	41,000	Milton.....	Public.....	1871	10,000
Bangor.....	Public.....	1838	23,975	Natick.....	Morse Institute.....	1874	13,474
	Theological Seminary.....	1820	30,000	New Bedford.....	Free Public.....	1863	50,000
Brunswick.....	Bowdoin College.....	1802	34,450	Newburyport.....	Free Public.....	1854	25,282
Portland.....	Maine Historical Society.....	1822	10,000	Newton.....	Free Public.....	1870	23,309
	Public.....	1867	31,000		Theological Institution.....	1826	10,000
Waterville.....	Colby University.....	1820	19,370	Northampton.....	Free Public.....	1860	20,000
				North Easton.....	Ames Free.....	1877	11,000
				Peabody.....	Peabody Institute.....	1853	25,506
				Pittsfield.....	Berkshire Athenaeum.....	1871	16,000
				Quincy.....	Thomas Crane Public.....	1871	14,000
				Randolph.....	Turner Free.....	1876	10,000
				Salem.....	Athenaeum.....	1860	15,000
					Essex Institute.....	1848	37,000
				Somerville.....	Public.....	1873	12,637
				Southbridge.....	Public.....	1870	10,129
				South Hadley.....	Mount Holyoke Female Semi- nary.....	1838	11,000
				Springfield.....	City Library Association.....	1857	55,000
				Taunton.....	Public.....	1866	24,434

Place.	Name of Library.	Founded.	Number of Volumes.	Place.	Name of Library.	Founded.	Number of Volumes.
Waltham.....	Public.....	1865	18,000	Albany.....	State Law.....	1818	37,300
Watertown.....	Free Public.....	1868	15,791		Young Men's Association.....	1833	17,000
Wayland.....	Free Public.....	1846	10,000	Auburn.....	Auburn Theological Semi-		
Wellesley.....	Wellesley College.....	1875	30,321	brooklyn.....	nary.....	1821	16,417
Westfield.....	Westfield Athenæum.....	1864	14,000		Brooklyn.....	1857	90,000
Williamstown.....	Williams College.....	1793	23,000		Eastern District School.....	1866	17,000
Woburn.....	Public.....	1856	23,789		Long Island Historical Society.....	1863	41,000
Worcester.....	American Antiquarian Society.....	1812	80,000	Buffalo.....	Buffalo.....	1836	53,000
	College of the Holy Cross.....	1843	14,000		Canisius College.....	1876	14,500
	Free Public.....	1859	68,941		Grosvenor Public.....	1859	31,000
	Worcester Society of Anti-			Clinton.....	Hamilton College.....	1812	21,000
	quity.....	1875	10,000	Fordham.....	St. John's College.....	1846	24,000
				Geneseo.....	Wadsworth.....	1843	10,000
Michigan:				Geneva.....	Hobart College.....	1824	15,285
Ann Arbor.....	University of Michigan.....	1841	47,000	Hamilton.....	Madison University.....	1820	18,000
Bay City.....	University Law Department.....	1858	10,000	Ithaca.....	Cornell University.....	1868	51,840
Detroit.....	Public.....	1870	10,000		Cornell.....	1866	13,851
Grand Rapids.....	Public School.....	1855	68,633	Newburg.....	Free.....	1852	15,229
Holland.....	Hope College.....	1872	17,000	New York.....	American Geographical So-		
Kalamazoo.....	Public.....	1865	30,000		ciety.....	1852	18,000
Lansing.....	State.....	1843	11,419		American Institute.....	1833	13,000
Olivet.....	Olivet College.....	1828	46,000		American Seamen's Friend So-		
West Bay City.....	Sage Public.....	1844	12,829		ciety.....	1833	38,592
		1844	12,000		American Society of Civil En-		
Minnesota:					gineers.....	1852	16,375
Minneapolis.....	Athenæum.....	1859	14,000		Apprentices'.....	1830	69,557
	University of Minnesota.....	1869	20,000		Astor Library.....	1849	235,800
St. Paul.....	Minnesota Historical Society.....	1849	12,358		City Bar Association.....	1870	27,237
	Public.....	1882	11,500		College of the City of New		
	State.....	1849	14,142		York.....	1850	22,424
					College of St. Francis Xavier.....	1847	22,000
Mississippi:					Columbia College.....	1757	68,378
Jackson.....	State.....	1838	40,000		Cooper Union.....	1859	20,000
					Free Circulating and Open-		
Missouri:					dorfer Branch.....	1880	21,624
Columbia.....	University of Missouri.....	1840	12,776		General Theological Seminary		
Jefferson City.....	State.....	1833	18,000		of the P. E.....	1820	19,000
	State Law (Free).....	1821	30,000		Grand Lodge F. and A. Masons	1870	10,300
Kansas City.....	Kansas City Public.....	1876	14,000		Harlem.....	1826	12,000
St. Louis.....	Academy of Science.....	1856	10,000		Harmonic Social Club.....	1860	11,800
	Law Library Association.....	1838	14,830		Law Institute.....	1826	34,000
	Public.....	1865	60,000		Lenox.....	1870	25,000
	St. Louis Mercantile.....	1846	65,657		Maimonides L. B'nai B'rith.....	1852	26,840
Springfield.....	St. Louis University.....	1828	25,000		Mercantile Library Associa-		
	Dury College.....	1873	19,000		tion.....	1820	210,431
Nebraska:					N. Y. Academy of Medicine.....	1804	75,000
Lincoln.....	State.....	1856	24,398		New York Hospital.....	1796	16,000
Omaha.....	Public.....	1872	14,237		New York Society.....	1754	80,000
Nevada:					Union Theological Seminary.....	1838	50,000
Carson City.....	State.....	1864	18,000		Xavier Union of the City of		
New Hampshire:					New York.....	1871	13,746
Concord.....	New Hampshire Historical So-				Young Men's Christian Asso-		
	ciety.....	1822	10,300		ciation.....	1852	33,111
	Public.....	1855	11,000	Poughkeepsie.....	City.....	1810	14,210
	State.....	1818	20,000		Vassar College.....	1865	15,000
Hanover.....	Dartmouth College.....	1770	65,000	Rochester.....	Court of Appeals.....	1849	12,000
Manchester.....	City.....	1854	28,660		Public School Central.....	1862	11,217
Portsmouth.....	Portsmouth Athenæum.....	1817	15,133		Reynolds.....	1881	11,000
New Jersey:					Rochester Theological Semi-		
Burlington.....	Library Company of Burling-				nary.....	1851	20,500
	ton.....	1758	10,000		University of Rochester.....	1850	21,790
Madison.....	Drew Theological Seminary.....	1867	18,000	Schenectady.....	Union College.....	1795	24,608
Morristown.....	Library and Lyceum.....	1878	11,000	Sing Sing.....	Mount Pleasant Military Aca-		
Newark.....	Library Association.....	1847	27,523		demy.....	1830	12,000
New Brunswick.....	Gardner A. Sage.....	1872	38,000	Syracuse.....	Central.....	1856	15,889
	Rutger's College.....	1770	11,200		Court of Appeals.....	1849	10,120
	Theological Seminary of the				University.....	1871	15,000
	Reformed Church in Amer-			Troy.....	Young Men's Association.....	1834	27,210
	ica.....	1784	38,000	Utica.....	City.....	1838	10,179
Princeton.....	College of New Jersey.....	1746	65,000	West Point.....	U. S. Military Academy.....	1812	30,827
	Theological Seminary of the			N. Carolina:			
Trenton.....	Presbyterian Church.....	1821	48,000	Raleigh.....	State.....	1831	45,000
	State.....	1796	31,000				
New York:				Ohio:			
Albany.....	State.....	1818	128,871	Chillicothe.....	Public.....	1853	10,000
				Cincinnati.....	Cincinnati Law.....	1847	10,000
					Lane Theological Seminary.....	1835	13,680
					Public.....	1867	112,153
					St. Xavier College.....	1840	15,300
					Young Men's Mercantile.....	1835	50,000
				Cleveland.....	Case.....	1818	30,000
					Public.....	1868	45,905
				Columbus.....	Ohio State.....	1817	53,500
					Ohio State Law.....		18,000
					Public.....	1872	18,000
				Dayton.....	Public.....	1817	21,232

Place.	Name of Library.	Founded.	Number of Volumes.	Place.	Name of Library.	Founded.	Number of Volumes.
Delaware	Sturges Library, Ohio Wesleyan University	1854	13,786	Nashville	Vanderbilt University	1868	10,006
Gambia	Kenyon College	1865	20,000	Sewanee	University of the South	1868	16,000
Marietta	Marietta College	1835	20,130	Vermont:			
Oberlin	Oberlin College	1834	13,519	Burlington	Fletcher (free)	1874	18,606
Springfield	Public	1872	12,037	Lunenburg	University of Vermont	1800	35,000
Toledo	Public	1873	23,000	Montpelier	Cutting's	1851	14,000
Wooster	University of Wooster	1870	10,300	St. Johnsbury	State	1825	18,600
Oregon:				Vergennes	Athenaeum	1870	12,000
Portland	Library Association	1864	13,436		Vergennes	1876	22,220
Salem	State	1850	12,000	Virginia:			
Pennsylvania:				Ashland	Randolph Macon College	1834	10,000
Allegheny	Public School	1872	10,800	Hampden Sid.	Union Theological Seminary	1825	12,400
Beatty	Western Theological Seminary	1827	25,000	Lexington	Washington and Lee University	1796	18,000
Carlisle	St. Vincent's College	1846	24,000	Richmond	State	1822	15,000
Easton	Dickinson College	1783	29,787	Salem	Virginia Historical Society	1831	12,883
Germantown	Lafayette College	1832	19,346	Theological Seminary	Roumoke College	1853	16,000
Gettysburg	Friends' Free	1869	13,000	University of Virginia	Theological Seminary of the P. E. Church	1823	12,000
Harrisburg	Theological Seminary (Lutheran)	1826	12,000		University of Virginia	1825	17,000
Hathoro	State	1816	60,000	Wisconsin:			
Haverford	Union	1755	10,164	Appleton	Appleton Library of Lawrence University	1858	10,740
Jersey Shore	Haverford College	1833	15,530	Beloit	Beloit College	1848	12,540
Lancaster	Eclectic Institute	1835	10,000	Madison	State	1839	18,954
Lewisburg	Theological Seminary (Reformed)	1825	10,000		State Historical Society	1849	116,750
Meadville	University	1853	13,000	Milwaukee	University of Wisconsin	1849	14,436
Overbrook	Allegheny College	1820	12,000	Nashotah	Milwaukee Public	1878	34,887
Philadelphia	Theological School	1845	18,000	St. Francis	Nashotah Theological Seminary	1842	10,500
	St. Charles Seminary	1833	16,500		St. Francis Seminary	1850	11,000
	Academy of Natural Sciences	1812	10,000				
	American Philosophical Society	1743	50,000				
	American Sunday School Union	1824	10,000				
	Apprentices Library Company	1820	18,000				
	Athenaeum	1814	25,000				
	College of Physicians	1789	37,048				
	Franklin Institute	1824	24,240				
	German Society of Pennsylvania	1817	22,000				
	Historical Society of Pennsylvania	1894	28,162				
	Library Company of Philadelphia	1731	150,000				
	Law Association	1802	19,112				
	Mercantile Library Company	1821	132,000				
	Mutual Library Company	1879	33,400				
	Odd Fellows	1846	12,400				
	Pennsylvania Hospital	1763	15,000				
	Presbyterian Historical Society	1852	20,000				
	Public School	1831	18,757				
	Spring Garden Institute	1850	13,000				
	Theological Seminary (Evangelical Lutheran)	1755	17,000				
	University of Pennsylvania	1875	28,000				
	Wilson's Circulating	1875	32,300				
Pittsburgh	Allegheny County Law	1867	15,000				
	Bishop Bowman Institute	1867	15,000				
	Pittsburgh Library Association	1851	19,000				
S. Bethlehem	Lehigh University	1878	61,000				
Rhode Island:							
Newport	Peoples'	1870	25,650				
	Redwood Library and Athenaeum	1730	31,700				
Providence	Athenaeum	1836	44,582				
	Brown University	1768	82,500				
	Public	1878	33,047				
	R. I. Historical Society	1822	16,000				
	State Law	1868	12,000				
S. Carolina:							
Charleston	Charleston Library Society	1748	19,000				
Columbia	Presbyterian Theological Seminary	1829	22,000				
	South Carolina College	1805	27,000				
	State	1866	36,000				
Tennessee:							
Lebanon	Cumberland University	1842	10,000				
Nashville	State	1851	30,000				

For general article on LIBRARIES, see Britannica, Vol. XIV, pp. 509-551.

LICENSE, as it is to be understood in this article, is a permit, granted by the proper authority, to keep a saloon, hotel, or tavern; to sell wine, beer, ale, liquor, cigars, or other merchandise; to peddle goods; to keep certain animals; to conduct shows, or other entertainments. Licenses are granted by the States or municipalities, and have to be paid for. One purpose in granting them is to secure good morals and public health; another, more subordinate purpose is to raise a public revenue. Licenses are also granted by the United States. Since the national authority is paramount to that of any State, a State license which violates a United States law is null and void. License fees imposed by federal authority as a tax for revenue only cannot interfere with anything allowed or prohibited under State laws. The federal license tax which liquor-dealers are required to pay does not allow the sale of liquors in any State where, as in Maine, Kansas, and Iowa, such sale is forbidden by the State law. The United States liquor license is, therefore, not a permit to sell liquor, but only a governmental tax upon the liquor-selling business, if such is carried on by virtue of the State or municipal license.

At present, licenses for selling wine, beer or liquors are granted in all the States of the Union except Maine, Kansas, Iowa, Vermont and New Hampshire. The respective laws differ but little from one another. Most of them are based upon the laws of Massachusetts and New York, these two States having had the most to do with license legislation. The Tennessee law forbids any person to sell or "tipple any intoxicating beverage within four miles of an incorporated institution of learning." The law of Florida is noteworthy for a sec-

tion requiring every application for a license to sell liquors, wine, or beer "to be signed by a majority of the registered voters in such election district which said signing shall be in the presence of at least two credible witnesses." "Local" option is the right of a county, town, or village to prohibit the liquor traffic within its borders. Local option laws obtain in the States of Maryland, North and South Carolina, Georgia, Texas, and Arkansas. "Prohibition" by constitutional provisions obtains in Maine, Iowa, and Kansas; and prohibition by statutory laws obtains in New Hampshire and Vermont.

In many parts of the United States "high-license" legislation has been agitated during the last twenty years. But "high-license laws" were only passed in Nebraska in 1881 and in Illinois in 1883. They differ from the general license system only in the higher fees to be paid.

The general features of all license laws for selling liquor are:

1. Licenses shall be issued only to proper persons.
2. Each license shall contain restrictive conditions.
3. The hours of opening and closing the saloons shall be regulated.
4. All licensed places shall be kept under vigilant control.
5. All violations of the law shall be punished.
6. In granting a license the requirements of the neighborhood shall be properly considered.

In church law a "License" is a permit to preach, to conduct religious services, or to administer ordinances. The authority granting such license may be the church, council, conference, consistory, or bishop. The scope of the power committed varies with the tenets and practices of the several branches of the Christian church.

LICTORS, among the ancient Romans, officers whose duty it was to attend upon the magistrates, bearing the fasces, in order to clear the way and enforce due respect, and also to administer punishment to offenders, and to perform other public functions. They were originally required to be free-born, but under the empire freedmen were admitted to the office.

LIDDELL, HENRY GEORGE, an English clergyman, born at Easingham, Durham, in 1811. After being educated at Christ Church, Oxford, he became a tutor in the college, afterwards head-master

of Westminster school, and domestic chaplain to Prince Albert. In 1855 he was made dean of Christ Church, and in 1870 vice-chancellor of the University of Oxford. In connection with Robert Scott he wrote a valuable *Greek Lexicon* (1843), and afterwards a *History of Rome* (1855), both of which passed through many editions.

LIDDON, HENRY PARRY (1829-1890), an English clergyman, educated at Christ Church, Oxford. He became vice-principal of the theological school at Cuddesden in 1854. In 1864 he was appointed prebendary in Salisbury cathedral, and in 1870 he was made canon residentiary of St. Paul's cathedral and professor of Scripture Exegesis at Oxford. He was an earnest defender and expounder of High-Church doctrine. Liddon published *Lenten Sermons*; *The Divinity of our Lord*; and *Some Words for God*.

LIE, JONAS LAURITZ EDEMI, a Norwegian novelist, born at Eker, near Drammen, in 1833. He spent his youth at Tromsø, a town and island in Finnmark, the life and scenery of which he well depicted in his works. Among his writings are *Den Fremtsynte*; *Billeder fra Nordland*; *Adam Schrader*; *Livsslaven*; and *En Malström* (1884). Some of these works have been translated into English.

LIEBRECHT, FELIX, linguist and folklorist, born at Namslau, in Silesia, March 13, 1812, died at St. Hubart, in Belgium, August 1, 1890. He studied at Breslau, Munich, and Berlin; and became in 1849 professor of the German language at the Athénée Royal in Liège, from which he retired in 1867. Liebrecht early became known through his series of admirable articles in various learned journals on the origin and diffusion of popular stories, and by translations enriched with valuable annotations. Among these are *Basile's Pentameron*, oder das Märchen aller Märchen; the *Barlaam und Josaphat* of Joannes Damascenus; Dunlop's *Geschichte der Prosadichtungen*; and an edition of the non-historical portions of Gervase of Tilbury's *Otia Imperiali*.

LIEUTENANT-COLONEL, an army officer below a colonel and above a major. In the British army he is nominally the officer of a regiment but virtually commands, the post of colonel being merely an honorable sinecure.

LIFE-BELT. See Britannica, Vol. XIV, p. 571.

LIFE-BOAT. See Britannica, Vol. XIV, pp. 570-72.

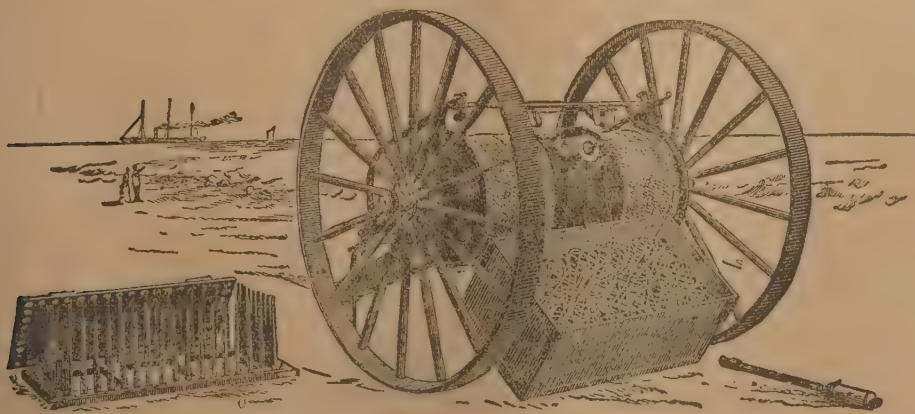


FIG. 9.—REAR SECTION OF McLEHLAN'S APPARATUS WAGON, SHOWING GUN, FAKING-BOX, ETC.

LIFE-SAVING SERVICE

(UNITED STATES).

THIS service was organized in conformity to an act of Congress approved June 18, 1872. It is an organization for the succor and rescue of seafarers subjected to shipwreck, upon the sea and lake coast of the United States. It is distinguished not only by its uniqueness and magnitude—there is no similar governmental institution anywhere else in the world—but also by the extraordinary success which has attended its efforts to save life and property upon occasions of maritime disaster. This service is under the control of the United States Treasury Department. It includes all points of danger on nearly ten thousand miles of coast. The entire coast is divided into twelve districts. A general superintendent presides over the organization, who, with his assistant, has his headquarters in the Treasury at Washington. There is an inspector of life-saving stations at New York, and there are two superintendents of construction for the Atlantic and lake coasts and two for the Pacific who supervise the building and repairs of the stations and purchase their equipments. An officer of the revenue marine acts as assistant or local inspector in each district. He sees that the stations are kept in proper order and the crews well-practiced in the use of the life-saving appliances. Besides the local inspector there is in each district a superintendent who manages its affairs under the direction of the general superintendent. At each life-saving station there is a keeper who must be an expert surferman. He is by law an inspector of customs and has power over all stranded property. Under him is a crew of seven experienced surfmen. For the pay of \$50 a month these men have to risk

over the same ground, then a third, and so on until the night is passed. This constant patrolling of desolate coasts on dark nights and foggy days is often a very severe task; but it is faithfully performed.

The stations (Fig. 1) are two-story wooden houses containing six or seven rooms. They are well supplied with all life-saving appliances, and are also fitted up for the residence of the crews. On dangerous coasts where wrecks are frequent they are only about five miles apart. Most of them are now connected by telephone. On many of them there is a team of horses kept, in order to lighten the labors of the men in moving heavy apparatus to the places where rescues have to be made.

The equipment for a complete life-saving station is as follows: 1. A six-oared surfboat with its carriage (see LIFE-BEAT in Britannica). 2. A Lyle gun



Fig. 2—THE LYLE GUN.

(Fig. 2), This is an invention of Capt. D. A. Lyle, U. S. A. It is made of bronze. The shot line is tied to the extremity of the cylindrical shot, which is fired across an endangered vessel or wreck. 3.

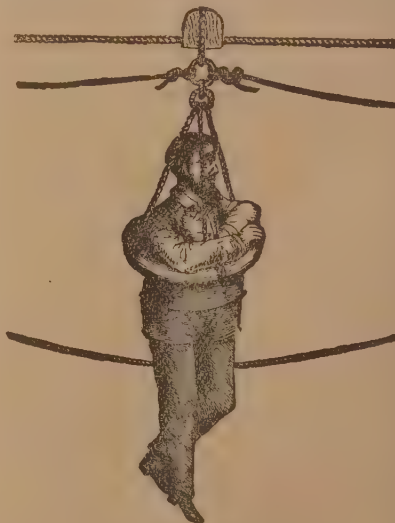


Fig. 3.



Fig. 1.

their lives in effecting rescues on occasions of shipwreck, and have to patrol a certain beat every night and during foggy days. On these patrols they look out for stranded vessels and vessels in danger or distress. For the proper watching of the coast the station men are divided into four watches of two men in each. The first watch leaves the station at sunset. One of the two men composing the watch goes to the left, the other to the right. Each one marches on until he meets the patrolman of the adjacent station in his direction. After exchanging metal checks (suitably inscribed) each patrolman returns to his station, and presents his check to the keeper as proof of the performance of his duty. Then a second watch sets out and goes

Lines of various sizes, from the shot-line of linen thread, $\frac{1}{4}$ inch thick, to the great hawser on which is to be slung the breeches, buoy or life-car (Figs. 3, 4, and 5).

4. A faking-box (Fig. 6), or contrivance for so arranging the shot-line as to facilitate its right to a

wreck without friction or entanglement. 5. A life-car (Fig. 5). This is a covered boat made of corrugated iron, in order to make it retain its shape without the aid of ribs or stays.

6. Breeches-buoys (Figs. 3 and 4). A breeches-buoy is a circular ring of cork, from which depends a stout pair of canvas breeches, all arranged to be hung by an iron ring to a hawser. If a man is suspended in a breeches-buoy he can swiftly be drawn along the rope to the shore.

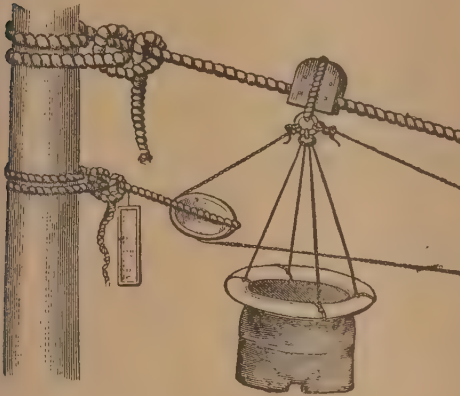


Fig. 4.

7. Merrimal life-saving suits of India Rubber (Fig. 7). These suits are double above the waist so,

as to be capable of inflation by rubber tubes appended to them. They cover the entire body except the face. Surfmén wear these suits when they rescue persons struggling in the breakers. 8. Cork-life belts. They are worn by the crews while on service at wrecks. (See Britannica, Vol. XIV, p. 571.)

9. Anchors, small boats, tools of various kinds, beds, bedding, a box of Coston lights for signaling



Fig. 5.

wrecks, a medicine chest containing various medicinal preparations, and numerous incidental articles. To draw all these things to the scene of a shipwreck an apparatus-wagon (Figs. 8 and 9) is used, which is in two sections detachable from each other. It carries the Lyle gun upon its rear sec-

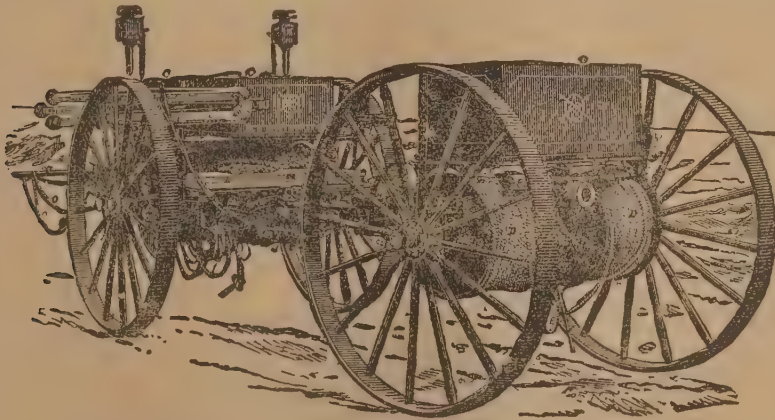


FIG. 8.—FULL VIEW OF MCLELLAN'S LIFE-SAVING APPARATUS WAGON.

A. Lyle gun. B. Line ready to be fired. CCC. Shot line boxes. DD. Whip-line. E. Whip-line, block and tally-board. F. Rammer and sponge. G. Pin-frame and false bottom upon which shot-line is faked. H. Breeches buoy. I. Tackle. J. Hawser. K. Sand-anchor. L. Tripod. M. Flag-pole. N. Ax. OO. Drag-ropes.

tion, where the gun is permanently mounted. The hawser and hauling-lines on their reels, faking-boxes, signal poles, and other appliances occupy the other parts of the wagon. The boat is usually transported upon a separate carriage (Fig. 10).

The stations, their apparatuses and stores are, by the regulations of the service, kept with the regard to order and precision of a man of war.

Besides the appliances provided by the government, most of the stations are furnished by generous private citizens with books for the use of the surfmen when not on duty. The stations are likewise provided with various articles of clothing for men and women; with restoratives, additional bedding and various delicacies for the sick. These articles are sent by a society of ladies

known as the "Woman's National Relief Association," and are intended for the use of the persons rescued from shipwreck.

The mode of service at wrecks is as follows: When a vessel is driven ashore by day she is seen by the station lookout, who is on top of the house. If it is by night, the patrolman walking along the coast descries her struggling in the breakers, and he at once ignites his Coston lights. These lights

emit a brilliant red flare of about two minutes' duration. This notifies the persons on board that they have been seen and that assistance is near. The patrolman then hurries to the station, where he reports to the keeper. The latter then hastens with his crew and a wagon load of apparatus to the assistance of the distressed vessel. Sometimes the large life-boat is launched, at other times the lighter surf-boat (Fig. 10) is hauled overland to a



Fig. 6.—SHOT-LINE FLYING TO WRECK FROM FAKING-BOX.

point opposite the wreck, and there launched. The keeper being the commander and the steersman of the boat, he has to decide what course of action must be pursued. When he reaches the vessel women, children, helpless persons and passengers are first taken into his boat—no scrambling,

pushing or pressing is allowed on such occasions—and the wrecked crew and officers are shipped last. Baggage or goods are not allowed to be taken into the rescuing boat until every living person has been landed.

Should the sea be so turbulent that no boat can

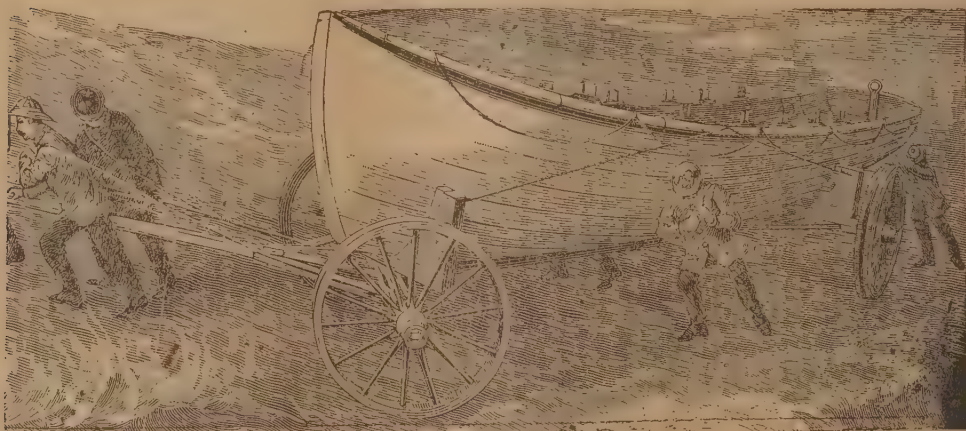


Fig. 10.

live in it, the method of rescue by means of the wreck-ordnance is resorted to. A line attached to the shot of the wreck-gun (Fig. 2) is fired over and across the wrecked vessel. Pulling on this line the people on the wreck haul on board a rope, *r*, without ends, and finally get a tail-block, *c*, (Fig. 4), which has a whip-line rove through it. They fasten the tail of the block to a mast, *m*, of the wrecked vessel, or to any other firm portion of the hull situated well up. Next the hawser, *h*, is pulled on board in a similar way and fastened to the mast above the other rope. The shore end of the hawser is drawn over an upright crotch or shear-legs,

guyed or braced to a sand anchor, *a*, in its rear, as seen in Figure 11. When all is ready, the wrecked people are brought ashore, either one by one in the breeches-buoy, or six at a trip in the life-car (Fig. 5). The latter is seldom used on our coasts; the breeches-buoy and surf-boats are generally employed. For illuminating the beach during the wrecking operations, the surfmen suspend a so-called "sausage light" (shown in the upper right-hand corner of Figure 11) from a tripod on shore. Immediately upon being landed the rescued people are conveyed to the station, and there they are cared for until they are able to help themselves.

That the crew may become skilled in the handling of the life-lines and breeches-buoys, a constant system of practice is maintained at the stations. For this purpose a pole is set up in the shallow water near the shore, say 75 yards from the place



Fig. 7.—SURFMAN IN MERRIMAN LIFE-SAVING DRESS.

of practice. This pole represents the mast of a wrecked vessel. The crew are first called upon in the boat-house by number, and are examined

orally. They have to recite the details of the exercise as set down in the service manual. At the words of command they then fall into place at the drag-rope, and draw the apparatus to the drilling-ground. A man has been placed upon the pole. At the word "action" the crew proceed to rig the apparatus and bring their comrade down from the pole in the breeches-buoy. The time required is noted and recorded. If in one month after the active season has commenced the work cannot be done in five minutes, the men are cautioned. Further admonition is rarely necessary. In fact, an active rivalry exists between many of the stations to perform this mimic rescue in the shortest time. It has been effected in two and a half minutes. This was in the day-time. At night-drills it has been done in three minutes.

In addition to the wrecking drill the crew are exercised every week in boat practice, including launching and landing through the surf, with at least half an hour's rowing; they are also practiced in signaling with miniature flags, accompanied by oral examinations in the main features of the international code of signals, and they are regularly drilled in the manipulation of persons apparently drowned, one of the surfmen serving as the subject to be resuscitated. When this ceaseless round of practice work is superimposed upon the regular patrol and other duties, it will be understood that the time and muscles of the surfmen are fully occupied. On the monthly visits of the inspectors the latter mark in their drill-books the proficiency of each member of the station force and report it to the general superintendent, who keeps the record of the rating of every man in the life-saving service.

Upon the sea and lake coasts of the United States there are now about 226 government life-saving stations. Of these 165 are on the Atlantic shores, 8 on the Gulf of Mexico, 8 on the Pacific and 45 on the great lakes. One river station is at Louisville, Ky., on the falls of the Ohio River. The following list gives the names and locations of the stations, classified by districts, as returned in the official report of the General Superintendent of the Life-Saving Service, published in 1891:



Fig. 11.—NIGHT WRECKING OPERATIONS ILLUMINATED BY "SAUSAGE-LIGHT."

FIRST DISTRICT—COASTS OF MAINE AND NEW HAMPSHIRE.

Station.	Locality.
Quoddy Head.....	Carrying Point Cove.
Cross Island.....	Off Machias Port.
Crumple Island.....	Off Jonesport.
Cranberry Isles.....	Little Cranberry Island, off Mount Desert.
White Head.....	On southwest end White Head Island.
Huntwell's Beach.....	On west side mouth Kennebec River.
Cape Elizabeth.....	Near the lights.
Fletcher's Neck.....	Biddeford Pool, Fletcher's Neck.
Jerry's Point.....	Southeast point Great Island, Portsmouth Harbor.
Rye Beach.....	North end Rye Beach.

SECOND DISTRICT—COAST OF MASSACHUSETTS.

Plum Island.....	Near mouth of Merrimac River.
Davis's Neck.....	Near Amesquam light.
North Scituate.....	$\frac{2}{3}$ miles south of Minot's Ledge Light.
Fourth Cliff.....	South end of Fourth Cliff Scituate.
Gurnet.....	$\frac{4}{5}$ miles northeast of Plymouth.
Manomet Point.....	$\frac{6}{10}$ miles southeast of Plymouth.
Race Point.....	$\frac{6}{10}$ mile northeast of Race Point light.
Peaked Hill Bars.....	$\frac{2}{3}$ miles northeast of Provincetown.
High Head.....	$\frac{3}{4}$ miles northwest of Highland light.
Highland.....	$\frac{2}{3}$ mile northwest of Highland light.
Pamet River.....	$\frac{3}{4}$ miles south of Highland light.
Cahoon's Hollow.....	$\frac{2}{3}$ miles east of Wellfleet.
Nauset.....	$\frac{1}{2}$ miles south of Nauset light.
Orleans.....	Abreast of Ponchet Island.
Chatham.....	On beach abreast of Chatham.
Monomoy.....	$\frac{2}{3}$ miles north of Monomoy light.
Coskata.....	$\frac{2}{3}$ miles south of Nantucket (Great Point) light.
Surfside.....	$\frac{2}{3}$ miles south of the town of Nantucket.
Muskeget.....	About midway of Muskeget Island.

THIRD DISTRICT—COASTS OF RHODE ISLAND AND LONG ISLAND.

Brenton's Point.....	On Price's Neck.
Narragansett Pier.....	Northern part of the town.
Point Judith.....	Near light.
Watch Hill.....	Near light.
New Shoreham.....	Block Island, east side, near landing.
Block Island.....	Block Island, west side, near Dicken's Point.
Montauk Point.....	At the light.
Ditch Plain.....	$\frac{3}{4}$ miles southwest of Montauk light.
Hither Plain.....	$\frac{1}{2}$ mile southwest of Fort Pond.
Napeague.....	Abreast of Napeague Harbor.
Amagansett.....	Abreast of the village.
Georgica.....	1 mile south of village of East Hampton.
Mecox.....	$\frac{2}{3}$ miles south of the village of Bridgehampton.
Southampton.....	$\frac{3}{4}$ mile south of the village.
Shinnecock.....	$\frac{2}{3}$ miles southeast of Shinnecock light.
Tiana.....	$\frac{2}{3}$ miles southwest of Shinnecock light.
Quogue.....	$\frac{1}{2}$ mile south of the village.
Petunk.....	$\frac{1}{4}$ miles southwest of Petunk village.
Moriches.....	$\frac{2}{3}$ miles southwest of Speonk village.
Forge River.....	$\frac{3}{4}$ miles south of Moriches.
Smith's Point.....	Abreast of the point.
Bellport.....	$\frac{4}{5}$ miles south of village.
Blue Point.....	$\frac{4}{5}$ miles south of Patchogue.
Lone Hill.....	$\frac{8}{10}$ miles east of Fire Island light.
Point of Woods.....	$\frac{4}{5}$ miles east of Fire Island light.
Fire Island.....	$\frac{1}{2}$ mile west of Fire Island.
Oak Island.....	East end of Oak Island.
Glgo.....	West end of Oak Island.
Jones's Beach.....	East end of Jones's Beach.
Zach's Inlet.....	West end of Jones's Beach.
Short Beach.....	$\frac{1}{2}$ mile east of Jones's Inlet.
Point Lookout.....	$\frac{2}{3}$ miles west of New Inlet.
Long Beach.....	Near Lucy's Inlet.
Far Rockaway.....	East end of Rockaway Beach.
Rockaway.....	Near the village of Rockaway.
Rockaway Point.....	West end of Rockaway Beach.
Coney Island.....	Manhattan Beach.
Eaton's Neck.....	East side entrance to Huntington Bay, Long Island Sound.

FOURTH DISTRICT—COAST OF NEW JERSEY.

Sandy Hook.....	East of Main light.
Spermaceti.....	$\frac{2}{3}$ miles south of Sandy Hook light.
Seabright.....	About a mile south of Navesink light.
Monmouth Beach.....	About a mile south of Seabright.
Long Branch.....	Green's Pond.
Deal.....	Asbury Park.
Shark River.....	Near the mouth of Shark River.
Spring Lake.....	$\frac{2}{3}$ miles south of Shark River.
Squan Beach.....	1 mile southeast of Squan village.
Bayhead.....	At the head of Barnegat Bay.

FOURTH DISTRICT—COAST OF NEW JERSEY.

Station.	Locality.
Mantoloking.....	$\frac{2}{3}$ miles south of head of Barnegat Bay.
Chadwick's.....	$\frac{5}{8}$ miles south of head of Barnegat Bay, on the beach abreast mouth Tom's River.
Tom's River.....	$\frac{1}{4}$ miles south of Seaside Park.
Island Beach.....	$\frac{5}{8}$ miles north of Barnegat Inlet.
Cedar Creek.....	$\frac{5}{8}$ miles north of Barnegat Inlet.
Forked River.....	$\frac{2}{3}$ miles north of Barnegat Inlet.
Barnegat.....	South side of Barnegat Inlet.
Loveladies Island.....	$\frac{2}{3}$ miles south of Barnegat Inlet.
Ship Bottom.....	$\frac{5}{8}$ miles south of Barnegat Inlet.
Long Beach.....	Midway of Long Beach.
Bond's.....	$\frac{1}{4}$ miles north of Beach Haven.
Little Egg.....	$\frac{2}{3}$ miles south of Beach Haven.
Little Beach.....	Near the light north of Inlet.
Brigantine.....	South side of Little Egg Inlet.
South Brigantine.....	$\frac{5}{8}$ miles north of the Absecon light.
Atlantic City.....	$\frac{3}{4}$ miles north of the Absecon light.
Absecon.....	At Absecon light.
Great Egg.....	$\frac{3}{4}$ miles south of Absecon light.
Ocean City.....	South side of Egg Harbor Inlet.
Peck's Beach.....	$\frac{2}{3}$ miles north of Corson's Inlet.
Corson's Inlet.....	Near the Inlet, north side.
Sea Isle City.....	$\frac{3}{4}$ miles north of Townsend's Inlet.
Townsend's Inlet.....	Near the Inlet, north side.
Tatham's.....	$\frac{3}{4}$ miles north of Hereford Inlet.
Hereford Inlet.....	Near Hereford light.
Holly Beach.....	6 miles northeast of Cape May City.
Turtle Gut.....	4 miles northeast of Cape May City.
Cold Spring.....	1 mile east of Cape May City.
Cape May.....	Near the light.
Bay Shore.....	$\frac{2}{3}$ miles west of Cape May City.

FIFTH DISTRICT—COASTS OF DELAWARE, MARYLAND AND VIRGINIA.*

Lewes.....	$\frac{2}{3}$ miles west of Cape Henlopen light.
Cape Henlopen.....	$\frac{7}{8}$ mile southerly of Cape Henlopen light.
Rehoboth Beach.....	Opposite north end of Rehoboth Bay.
Indian River Inlet.....	North of Inlet.
Ocean City.....	Just north of village.
North Beach.....	$\frac{10}{10}$ miles south of Ocean City.
Green Run Inlet.....	$\frac{13}{16}$ miles northeast of Assateague light.
Pope's Island.....	$\frac{10}{10}$ miles northeast of Assateague light.
Assateague Beach.....	$\frac{1}{4}$ miles south of Assateague light.
Wallop's Beach.....	$\frac{1}{4}$ miles south of Chincoteague Inlet.
Matomkin Inlet.....	On Matomkin Beach, near the Inlet.
Wachapreague.....	South end of Cedar Island.
Paramore's Beach.....	Midway of Beach.
Hog Island.....	South end of Hog Island.
Cobb's Island.....	South end of Cobb's Island.
Smith's Island.....	At Cape Charles light.

* Cape Henlopen to Cape Charles.

SIXTH DISTRICT—COASTS OF VIRGINIA AND NORTH CAROLINA.*

Cape Henry.....	$\frac{3}{4}$ mile southeast of Cape Henry light.
Seatack.....	$\frac{5}{8}$ miles south of Cape Henry light.
Danco Neck Mills.....	$\frac{3}{4}$ miles south of Cape Henry light.
Little Inlet.....	On beach abreast of North Bay.
False Cape.....	On beach abreast of Back Bay.
Wash Woods.....	On beach abreast of Knott's Island.
Currituck Inlet.....	$\frac{5}{8}$ miles north of Currituck Beach light.
Whale's Head.....	$\frac{7}{8}$ mile south of Currituck Beach light.
Poyner's Hill.....	$\frac{6}{10}$ miles south of Currituck Beach light.
Caffey's Inlet.....	$\frac{10}{10}$ miles south of Currituck Beach light.
Paul Gamiel's Hill.....	$\frac{5}{8}$ miles north of Kitty Hawk.
Kitty Hawk.....	On the beach abreast of north end of Kitty Hawk Bay.
Kill Devil Hills.....	$\frac{4}{5}$ miles south of Kitty Hawk.
Nag's Head.....	$\frac{9}{10}$ miles north of Oregon Inlet.
Bodie's Island.....	$\frac{3}{8}$ mile northeast of Bodie's Island light.
Oregon Inlet.....	$\frac{1}{2}$ mile south of Oregon Inlet.
Pea Island.....	$\frac{2}{3}$ miles north of New Inlet.
New Inlet.....	$\frac{1}{2}$ mile south of New Inlet.
Chincoteague.....	$\frac{5}{8}$ miles south of New Inlet.
Gull Shoal.....	$\frac{13}{16}$ miles south of New Inlet.
Little Kinnakeet.....	$\frac{11}{16}$ miles north of Cape Hatteras light.
Big Kinnakeet.....	$\frac{5}{8}$ miles north of Cape Hatteras light.
Cape Hatteras.....	1 mile south of Hatteras light.

* From Cape Henry to Cape Fear.

SIXTH DISTRICT—COAST OF VIRGINIA AND NORTH CAROLINA.

Station.	Locality.
Creed's Hill.....	4 miles west of Cape Hatteras light.
Durant's.....	3 miles east of Hatteras Inlet.
Ocracoke.....	1½ miles west of Hatteras Inlet.
Cape Lookout.....	1½ miles south of Cape Lookout light.
Cape Fear.....	On Smith's Island, Cape Fear.
Oak Island.....	West side mouth Cape Fear River.

SEVENTH DISTRICT—COASTS OF SOUTH CAROLINA, GEORGIA AND EASTERN FLORIDA.

Morris Island.....	Near Charleston light.
Smith's Creek†.....	20 miles south of Matanzas Inlet.
Mosquito Lagoon.....	On beach outside the lagoon.
Chester Shoal†.....	11 miles north of Cape Canaveral.
Cape Malabar†.....	30 miles south of Cape Canaveral.
Bethel Creek†.....	11 miles north of Indian River Inlet.
Indian River Inlet†.....	South side of Inlet.
Gilbert's Bar†.....	Sainte Lucie Rocks, north side Sainte Lucie Inlet.
Jupiter Inlet.....	South side of Inlet.
Orange Grove†.....	Southern end Lake Worth, 32 miles south of Jupiter Inlet.
Fort Lauderdale†.....	7 miles north of New River Inlet.
Biscayne Bay†.....	10 miles north of Boca Ratones, Narrows Cut.

† House of refuge. No crew employed.

EIGHTH DISTRICT—GULF COAST OF UNITED STATES.

Santa Rosa.....	Santa Rosa Island, 3 miles east of Fort Pickens.
Sabine Pass.....	East side of Pass.
Galveston.....	East end Galveston Island.
San Luis.....	West end Galveston Island.
Velasco.....	East side, mouth of Brazos River.
Saluria.....	Northeast end Matagorda Island.
Aransas.....	Northeast end Mustang Island.
Brazos.....	North end Brazos Island, entrance to Brazos Santiago.

NINTH DISTRICT—LAKES ERIE AND ONTARIO.

Big Sandy.....	North side mouth of Big Sandy Creek, Lake Ontario.
Salmon Creek.....	East side mouth of Salmon Creek, Lake Ontario.
Oswego.....	East side entrance of Oswego Harbor, Lake Ontario.
Charlotte.....	East side entrance of Charlotte Harbor, Lake Ontario.
Buffalo.....	South side entrance of Buffalo Harbor, Lake Erie.
Erie.....	North side entrance of Erie Harbor, Lake Erie.
Fairport.....	West side entrance of Fairport Harbor, Lake Erie.
Cleveland.....	West side entrance of Cleveland Harbor, Lake Erie.
Point Marblehead.....	Point Marblehead, near Quarry Docks, Lake Erie.
Louisville.....	Falls of the Ohio River, Louisville, Ky.

† Destroyed by fire.

TENTH DISTRICT—LAKES HURON AND SUPERIOR.

Sand Beach.....	Inside Sand Beach Harbor, Lake Huron.
Pointe aux Barques.....	Near light, Lake Huron.
Grindstone City.....	1 mile northwest of city, Lake Huron.
Ottawa Point.....	Near light, Lake Huron.
Sturgeon Point.....	Near light, Lake Huron.
Thunder Bay Island.....	Near light, Lake Huron.
Middle Island.....	North end of Middle Island, Lake Huron.
Hammond's Bay.....	Hammond's Bay, Lake Huron.
Vermilion Point.....	10 miles west of White Fish Point, Lake Superior.
Crisp's.....	16 miles west of White Fish Point, Lake Superior.
Two Heart River.....	Near mouth of Two Heart River, Lake Superior.
Muskallonge Lake.....	Near mouth of Sucker River, Lake Superior.
Ship Canal.....	Old Portage Lake Ship Canal, near north end.

ELEVENTH DISTRICT—LAKE MICHIGAN.

Station.	Locality.
Beaver Island.....	Near light.
North Manitowish Island.....	Near Pickard's wharf.
Point Betsey.....	Near light.
Frankfort.....	South side entrance of harbor.
Manistee.....	North side entrance of harbor.
Grand Pointe au Sable.....	1 mile south of light.
Ludington.....	North side entrance of harbor.
Pont Water.....	North side entrance of harbor.
White River.....	North side entrance of White Lake.
Muskegon.....	North side entrance of harbor, Port Sherman.
Grand Haven.....	North side entrance of harbor.
Holland.....	In the harbor, south side.
South Haven.....	North side entrance of harbor.
Saint Joseph.....	In the harbor, north side.
Michigan City.....	East side entrance of harbor.
Chicago.....	In the harbor.
Evanson.....	On Northwestern University grounds.
Kenosha.....	In the harbor, on Washington Island.
Racine.....	In the harbor.
Milwaukee.....	Near entrance of harbor, south side.
Sheboygan.....	In the harbor, east side.
Two Rivers.....	North side entrance of harbor.
Sturgeon Bay Canal.....	Eastern entrance of canal, north side.

TWELFTH DISTRICT—PACIFIC COAST.

Neah Bay.....	On Indian reservation.
Shoalwater Bay.....	Near light-house boat-landing.
Cape Disappointment.....	Baker's Bay, 1½ miles northeast of light.
Cape Arago.....	Entrance of Coos Bay, near light.
Humboldt Bay.....	Near light.
Bolinas Bay.....	¾ mile north-northeast Bolinas Point.
Golden Gate Park.....	On beach in Golden Gate Park, San Francisco. ¾ mile south Point Lobos.

† Destroyed by fire.

The distribution of stations is regulated by the nature of the coast and the amount of commerce passing by or approaching it. From the eastern extremity of the coast of Maine to Cape Cod, there are but sixteen stations for 415 miles. The coast, for a great part rocky and precipitous, gives numerous harbors of refuge. Along Cape Cod a dangerous region appears, where there are ten stations, about eight miles distant from each other. The light formed by the shores of Long Island and New Jersey, with New York harbor at the apex, is renowned for its dangerous nature. Along 250 miles of the shores of this much frequented water-way there are 79 stations, giving an average distance of about three miles from station to station. Further south there is less commerce, and fewer stations are provided. For 175 miles from Cape Hatteras south to Cape Fear, there are but six stations, the distance between stations averaging nearly 30 miles. The coast of Florida is of such formation that vessels are generally wrecked close to shore and the crew can save themselves. Refuge stations for the supply of food and water are provided along the uninhabited portions of this coast. Their average distance apart is 26 miles. At each mile along the coast a guide post is erected, giving the distance and direction to the nearest refuge station. Each has provisions enough for twenty-five persons for ten days.

The great lakes have a coast of 2,500 miles extent. Most of the harbors of refuge are artificial, defined by piers and maintained by dredging. These are the scenes of most of the wrecks, as vessels in storms make for the nearest of them, and are liable to strand upon the shoals at their mouths. Forty-five stations protect this great extent of coast, being generally placed at or near harbors.

All these stations are fully supplied with life-boats, wreck-guns, beach-apparatus, and restoratives. The stations on the Atlantic coast from the eastern extremity of the State of Maine to Cape Fear, N. C.,

are manned by crews of experienced surfmen from September 1, until May 1. Upon the lake coasts the stations are manned from the opening until the close of navigation; and on the Pacific coast they are manned all the year round. Exceptions are made at the station on Beaver Island, Lake Michigan, and

at the stations on Neah Bay and Cape Arago, in Washington. These three stations depend on the volunteer efforts from the neighboring people in case of shipwreck. Neither are the houses of refuge manned by crews. Such houses are located exclusively upon the Florida coast. A keeper who



FIG. 12.—SHOWING THE FIRST STEP TAKEN, BY WHICH THE CHEST IS EMP-TIED OF AIR, AND THE EJECTION OF ANY FLUIDS SWALLOWED IS ASSISTED.

is supplied with boats, provisions, and restoratives, resides in each of them throughout the year. He is required to make extended excursions along the coast after every storm and find out if any shipwreck has occurred.

For resuscitating persons apparently drowned,

the following rules and directions are adhered to: After loosening his clothes turn the patient on his face, as seen in Figure 12; place a bundle of tightly-rolled clothing beneath his stomach, and press heavily over it for half a minute, or so long as fluids flow freely from his mouth. This will ex-



FIG. 13.—SHOWING THE POSITION AND ACTION OF THE OPERATOR, IN AL-TERNATELY PRODUCING ARTIFICIAL EXPIRATION AND INSPIRA-TION OF AIR.

pel water and air from his stomach and chest. If the jaws are clinched, separate them, and keep the mouth open by placing between the teeth a cork or small bit of wood.

To produce breathing clear the patient's mouth and throat of mucus by introducing into his throat the corner of a handkerchief wrapped closely around your forefinger. Turn the patient on his back, as

seen in Figure 13, and place the roll of clothing so beneath him that the pit of his stomach is raised above the level of any other part of his body. If there is another person present, let him with a piece of dry cloth hold the tip of the patient's tongue out of one corner of the mouth, and with the other hand grasp both wrists and keep the arms forcibly stretched back above the head. Kneel be-

side or astride the patients hips, and with the balls of your thumbs resting on either side of the pit of the stomach, let your fingers fall into grooves between the short ribs, so as to afford the best grasp of the waist. Now, using your knees as pivot, throw all your weight forward on your hands, and at the same time squeeze the waist between them, as if you wished to force everything in the chest upward and out of it. Deepen the pressure while you can slowly count three. Then suddenly let go with a final push, which springs you back to your first kneeling position. Remain erect on your knees while you count three. Then repeat the same motions as before at a rate gradually increasing from five to fifteen times in a minute, and continue thus this bellows movement with the same regularity that is observable in the natural motions of breathing which you are trying to imitate. If natural breathing be not restored after three to five minutes, roll the body over on its face for the purpose of freeing the air passages from any remaining water. Then turn the patient upon his back again, and continue the bellows movement as just described from one to four hours, or until he breathes. At the same time the patient's limbs

should be rubbed in an upward direction, with firm grasping pressure and energy, using the bare hands, and sometimes also dry flannels. Warm flannels must also be applied to the stomach and arm pits, and hot bottles or bricks to the soles of the feet.

After the breathing is restored, put the patient to bed and keep him comfortably warm. Give him whisky or brandy with hot water in doses to suit his weight of body, at first every fifteen minutes for about an hour, and afterwards at longer intervals. It must here be remarked, that the clinching of the jaws and the semi-contraction of the fingers are evidences of remaining vitality in persons apparently dead from drowning. They are signs of the first stage of suffocation by drowning, the jaws and hands becoming relaxed when actual death ensues. The muscular rigidity (*rigor mortis*) occurs later, always after this temporary relaxation. Therefore, the mere clinching of the jaws and semi-contraction of the hands must never be considered as reasons for discontinuing the effects to save life, but should serve as a stimulant to vigorous and prolonged efforts in producing respirations by means of the above described bellows movement.

Fiscal Year.	Number of casualties.	Number of persons on board.	Number of lives lost.	Ratio of lives lost to number on board.	Ratio of lives lost to number of casualties.
1875-76	1,553	18,134	*878	As 1 to 20.65	As 1 to 1.77
1876-77	1,547	22,307	*826	As 1 to 27.00	As 1 to 8.87
1877-78	1,483	21,531	*644	As 1 to 33.43	As 1 to 2.30
1878-79	1,545	23,353	*780	As 1 to 31.69	As 1 to 2.12
1879-80	1,624	26,491	*469	As 1 to 56.43	As 1 to 3.46
1880-81	1,528	24,286	*623	As 1 to 38.98	As 1 to 2.45
1881-82	1,514	25,712	*502	As 1 to 51.22	As 1 to 3.02
1882-83	1,416	25,197	*539	As 1 to 46.75	As 1 to 2.63
1883-84	1,647	26,561	*607	As 1 to 32.91	As 1 to 2.04
1884-85	1,407	29,594	*335	As 1 to 88.31	As 1 to 4.20
1885-86	1,650	26,680	*576	As 1 to 44.58	As 1 to 2.86
1886-87	1,494	23,992	*529	As 1 to 45.35	As 1 to 2.82
1887-88	1,461	22,717	*538	As 1 to 42.22	As 1 to 2.72
1888-89	1,468	25,097	*688	As 1 to 39.34	As 1 to 2.30

*This number is exclusive of lives lost where vessels suffered no material damage.

Fiscal Year.	Number of casualties.	Number of persons on board.	Number of lives lost.	Ratio of lives lost to number on board.	Ratio of lives lost to number of casualties.
1875-76	1,139	13,487	*501	As 1 to 26.92	As 1 to 2.27
1876-77	1,023	15,977	*278	As 1 to 57.47	As 1 to 3.68
1877-78	1,083	16,785	*408	As 1 to 41.65	As 1 to 2.69
1878-79	1,044	16,213	*232	As 1 to 73.18	As 1 to 4.70
1879-80	1,265	21,691	*170	As 1 to 127.59	As 1 to 7.44
1880-81	1,171	19,713	*272	As 1 to 72.47	As 1 to 4.31
1881-82	1,203	20,495	*241	As 1 to 85.04	As 1 to 4.99
1882-83	1,090	20,623	*338	As 1 to 62.88	As 1 to 3.32
1883-84	1,246	20,364	*327	As 1 to 62.28	As 1 to 3.81
1884-85	1,066	24,302	*107	As 1 to 227.12	As 1 to 9.96
1885-86	1,269	21,076	*266	As 1 to 79.33	As 1 to 4.77
1886-87	1,196	20,638	*302	As 1 to 68.00	As 1 to 3.96
1887-88	1,176	18,635	*285	As 1 to 79.80	As 1 to 5.00
1888-89	1,158	19,792	*263	As 1 to 78.23	As 1 to 4.58

*This number is exclusive of lives lost where vessels suffered no material damage.

The efficiency and usefulness of the United States life-saving service can be best appreciated by comparing the above tables. The figures in the last columns of these tables speak loudly in praise of our service. These tables are taken from the last official report of the general superintendent of the service. The last table is the same as the first except that it is confined to our own domain, the

disasters occurring at sea and in foreign waters being excluded.

To show the usefulness of this service still more clearly, we append here a

GENERAL SUMMARY

Of disasters which have occurred within the scope of life-saving operations from November 1, 1871 (date of introduc-

tion of present system), to close of fiscal year ending June 30, 1889.

Total number of disasters.....	4,923
Total value of vessels.....	\$55,473,165
Total value of cargoes.....	\$26,246,579
Total value of property involved.....	\$81,719,744
Total value of property saved.....	\$60,352,077
Total number of persons involved.....	\$21,367,667
Total number of lives lost.....	42,560
Total number of persons succored.....	502
Total number of persons succored.....	7,903
Total number of days' succor afforded.....	20,837

It is a notable feature of the United States life-saving service that it has always been free from any connection with politics. This feature has been secured by direct provision of law. It is undoubtedly one of the main factors of the remarkable success of the service. The keepers and crews of the stations are chosen solely for their fitness and capability, and are retained in the service so long as they remain efficient, no matter what their political status may be.

The life-saving crews are forbidden to solicit any rewards for services, but on account of the meagerness of their wages and the great risks of their calling, they are not forbidden to accept rewards if the owners or masters of wrecked vessels, or other persons, see fit to voluntarily bestow rewards upon them.

LIGATURE, an Italian term in music, meaning binding, frequently marked by a slur placed over

certain notes for the purpose of showing that they are blended together.

LIGHT AND AIR, RIGHTS TO. The owner of land has a right to the light and air which pass over it, and the right to obstruct it by erecting walls and buildings. He may also require the right to forbid the erection of buildings which shall obstruct them. In the United States rights of view, that is, rights to open windows and to forbid buildings which obstruct them, may be acquired; in some States uninterrupted enjoyment for twenty or fifteen years establishes the right. See ANCIENT LIGHTS in these Revisions and Additions.

LIGHTER, a capacious but shallow barge used in lightening or unloading, and also in loading ships.

LIGHTFOOT, JOSEPH BARBER, an English clergyman, born at Liverpool, in 1823. After being educated at Trinity College, Cambridge, he became tutor at the same school in 1857, and in 1875 professor of divinity there. In 1879 he was made bishop of Durham. He is a distinguished New Testament exegete, and was active in the revision of the English text. He has also annotated *St. Clement's Epistles to the Corinthians* (1869).

LIGHTHOUSE, a beacon for the guidance of seamen; a pharos. See Britannica, Vol. XIV, pp. 615-629.

LIGHT-HOUSE BOARD

An act of Congress approved Aug. 31, 1852, created the "Light-House Board" of the United States as it now exists. This act requires the President to appoint two officers of the navy of high rank, two officers of the corps of engineers of the army, two civilians of high scientific attainments whose services may be at the disposal of the President, together with an officer of the navy and an officer of engineers of the army as secretaries, who shall constitute the United States light-house board, the Secretary of the Treasury to be *ex officio* president of the board. The light-house board is attached to the office of the Secretary of the Treasury and attends, under his superintendence, to the administration of all matters relating to the construction, care, and maintenance of the United States light-houses, lightships, bouys, and all other aids to navigation. This board meets by law on the first Mondays in March, June, September, and December. In addition to these regular meetings there are called meetings about once every two weeks. This board divides its duties among standing committees on engineering, on floating aids to navigation, on lighting, on tests and experiments, and on locations. The last named committee has charge of matters relative to the location of light-houses, bouys, and other aids to navigation. The chairman of the board nominates the standing committees at the quarterly meetings. He and the two secretaries are *ex officio* members of all these committees; they are also the executive officers of the board. The secretaries perform all the routine business of the board under its regulations or the orders of the chairman when he is present. That secretary who is a naval officer called the "naval secretary," keeps the journal of the board's proceedings and has charge of the office, also of the floating aids to navigation, of supplies and of materials used for illumination. He also nominates the keepers of light-houses and light-ships, and the employes of the inspectors, and sees to their salaries, as well as to the performance of their duties. The secretary who is an army engineer called the "engineer secretary,"

has charge of all the fixed aids to navigation. He prepares the plans and estimates of the same, prepares all projects for the consideration of the committee on engineering, attends to the purchase and repair of illuminating apparatus, prepares the annual estimates for special works, for repairs, for fog signals, for the real estate of the light-house establishments, for the manufacturing establishments of the board on Staten Island—except the part relating to supplies—and he nominates the employes of light-house engineers, and sees to their salaries, as well as to the performance of their duties.

The light-house board was by law required to arrange the Atlantic, Gulf, Pacific, and Lake coasts into light-house districts not to exceed twelve in number. To each district was assigned an officer of the army or navy as inspector; and the President was required to detail from the engineer corps of the army such officers as might be required to superintend the construction and renovation of light-houses therein. Pursuant to this law the board divided the coasts into the following districts.

FIRST DISTRICT.—From the northeast boundary of Maine, to include Hampton Harbor, N. H. Headquarters at Portland, Me.

SECOND DISTRICT.—From Hampton Harbor, N. H., to include Gooseberry Point, Mass. Headquarters at Boston, Mass.

THIRD DISTRICT.—From Gooseberry Point, Mass., to include Squan Inlet, N. J., and also Lake Champlain and the Hudson River. Headquarters at Tomkinsville, Staten Island, N. Y.

FOURTH DISTRICT.—From Squan Inlet, N. J., to include Metomkin Inlet, Va., and also Delaware Bay and tributaries. Headquarters at Philadelphia, Pa.

FIFTH DISTRICT.—From Metomkin Inlet, Va., to include New River Inlet, N. C., and also Chesapeake Bay and tributaries, and Albemarle and Pamlico Sounds. Headquarters at Baltimore, Md.

SIXTH DISTRICT.—From New River Inlet, N. C., to include Cape Canaveral light-house, Fla. Headquarters at Charleston, S. C.

SEVENTH DISTRICT.—From Cape Canaveral light-house to the Perdido River, Fla. Headquarters at Key West, Fla.

EIGHTH DISTRICT.—From the Perdido River, Fla., to the Rio Grande, Tex. Headquarters at New Orleans, La.

(There is no NINTH DISTRICT.)

TENTH DISTRICT.—From the mouth of Saint Regis River to include Grassy Island light-house, Detroit River. Headquarters at Buffalo, N. Y.

ELEVENTH DISTRICT.—Includes all aids to navigation in the great lakes above Grassy Island light-house. Headquarters at Detroit, Mich.

TWELFTH DISTRICT.—Co-extensive with the coast of California. Headquarters at San Francisco, Cal.

THIRTEENTH DISTRICT.—Includes all aids to navigation in Oregon and Washington. Headquarters at Portland, Oregon.

By act of Congress approved June 23, 1874, the light-house board was required to divide the Mississippi, Ohio, and Missouri rivers into two additional light-house districts, and to lease the necessary ground for lights and beacons to point out changeable channels. Accordingly the following two districts were created.

FOURTEENTH DISTRICT.—Includes all aids to navigation on the Ohio River. Headquarters at Cincinnati, O.

FIFTEENTH DISTRICT.—Includes all aids to navigation on the Mississippi and Missouri rivers. Headquarters at St. Louis, Mo.

At the close of the fiscal year 1890, there were under the control of the light-house board the following aids to navigation. Light-houses and lighted beacons, including post-lights in third, fourth, fifth, sixth, eighth, and thirteenth districts, 1,021; light-ships in position, 26; light-ships for relief, 6; lighted buoys in position, 9; fog-signals operated by steam or hot air, 80; fog-signals operated by clock-work, 158; post-lights on the western rivers, 1,328; day or unlighted beacons, 388; whistling buoys in position, 62; bell-buoys in position, 70; other buoy's in position, including pile-buoys and stakes in fifth district, and twenty-six buoys in Alaskan waters, 4,152.

Light-houses are graded in different orders, according to the sizes of the lenses, the first order being the most powerful. The light-house board experimented with various illuminants, such as sperm, lard, colza, and mineral oils, and has finally decided that the mineral oil is the best and cheapest. Its adoption required the replacement of all the existing lamps by lamps suited to burning mineral oil. This has been gradually accomplished, and now mineral oil is in general use. This consumption of mineral oil is about twice as great as that of lard oil, but its cost is about one-quarter of the latter. This produces a saving of \$30,000 a year and secures a more powerful light at the same time. The following table shows the candle-powers of the lamps used in the different orders of lights:

First order	5 wicks	450 candle power.
Second "	3 "	163 "
Third "	2 "	73 "
Fourth "	1 wick	32 "
Fifth "	1 "	16 "
Sixth "	1 flat wick	125 "

Compressed gas, in addition to mineral oil, is used in gas-lighted buoys, and in the beacons in Currituck Sound, N. C., and at the end of the St. Louis River pier-head, Lake Superior. The latter are small lights and difficult to reach in bad weather. Their apparatus is so arranged that they will keep lighted without attention for several weeks.

The above mentioned 1,328 post-lights are located on the banks of the Mississippi, Ohio, Missouri, Savannah, Cape Fear, and Hudson rivers, and at the mouth of the Red River, La. These river lights consist of a high post set in the ground properly braced, and supporting a box, at the top, in which is placed an ordinary kerosene lantern. These simple structures are so located as to point out the various channels. They are valuable guides to river navigators, and can easily be shifted from place to place to correspond to the changes occurring in the river channels.

In the construction, care, and maintenance of the various aids to navigation there were employed during the last year: Steam tenders, 25; steam launches, 3; sailing tenders, 2; light-keepers, 1,031; other employes, including crews of light-ships and tenders, 849; laborers in charge of river lights, 1,273.

LIGHTING, ELECTRIC, see *Britannica*, Vol. XIV, pp. 631-3, and **ELECTRICITY**, in these Revisions and Additions.

The "Incandescent Light" depends on the fact that a current of electricity, when sent through an imperfect conductor, as a carbonized vegetable fiber, develops heat enough to raise the conductor to incandescence and yield a brilliant glow. In the Edison lamps carbonized bamboo fiber is used. It is inclosed in an exhausted glass bulb. If air should be present, the fiber would be burned up immediately upon reaching white heat. The vacuum must be made as perfect as possible, because the whiteness of the glow depends on the perfect freedom of the bulb from air, if the current has the proper strength.

The "Arc-Light" depends on the fact that a current passing through a broken conductor will leap over the intervening space with a bright spark, which, if the current is powerful, will become a continuous arc of light. For the interrupted conductor two rods of hard carbon are used. They are gradually burnt away. When Sir Humphrey Davy made the first arc-light, in 1813, he used the galvanic battery of the Royal Institution for producing the current, a battery composed of 2,000 zinc-copper couples. For the two carbon rods he used two pointed pieces of wood charcoal. The light produced was so intense as to rival the sunlight in brilliancy. But the charcoal points burnt away rather fast, because the heat in the arc was very intense. When the two carbon points were in a horizontal plane, the up-draft of air lifted the center of the flame so as to give it an arched form. This is the origin of the name "arc-light." There is no arched shape in the present arc-lights, when the two carbon pencils are in a vertical plane. When we speak of a flame here, we must explain that the space between the two carbon points is not occupied by incandescent gases, as in an ordinary flame, but by incandescent solid carbon particles, carried from one pole to the other. Since the positive carbon wastes away twice as fast as the negative one, it is generally assumed that the carbon particles are carried from the positive to the negative carbon. The positive carbon is placed uppermost because it becomes hollowed ("cratered") out, and the cavity ("crater") thereby produced acts as a reflector in concentrating the rays of light and throwing them downward where the light is wanted.

In lighting arc-lamps the two carbons are at first brought into contact with each other. As there is always a film of air between them at the point of contact, the ends of the carbons become red-hot when the electric current passes. This heat renders the carbons more conductive than while they

were in the cold state. The "regulator" is an ingenious contrivance placed above the arc-lamp. As soon as the current passes its increasing strength separates the two carbons automatically through the action of the regulator. This separation makes it possible for an arc to form between the two carbon points. The latter are usually only about $\frac{1}{4}$ inch apart, but sometimes they are even less than $\frac{1}{4}$ inch from each other. If the current is very powerful and of high tension, the arc may be longer. But if the current is weak, the arc must be shorter, or else it will be extinguished. If the two carbon points are close together while a strong current passes, the arc hisses like an angered goose. They must be separated a little farther in order to give the best light. The regulator is a very important part of the arc-lamp. As there are many in the market, and still more on the lists of the patented inventions, we cannot here enter into any detailed description of regulators. We only state in general that when the current flowing through a regulator increases, an electromagnet or a solenoid is thereby made more powerful and pulls the two carbons farther apart, and when the current decreases the carbons are allowed to come nearer together by the action of a spring which works contrary to the electromagnet or solenoid in the regulator. The carbon rods used in the arc-lamps are now made in special factories by special processes. Formerly gas carbon was ground finely, washed and mixed with a glutinous substance; then the mass was moulded into rods, and the latter were dried. At present lampblack is produced by the incomplete combustion of some hydro-carbon, as crude petroleum. This lampblack is mixed with a glutinous substance, and the mass is moulded into rods. The latter are then exposed to high heats in special furnaces, and the rods are afterwards covered with a film of copper.

At one stage of the development of arc-lighting Jablochkoff's "electric candle" was much used, especially in France. In this device two sticks of carbon are placed side by side and separated by a thin layer of kaolin, or other incombustible non-conductor. This insulating material is, however, omitted at the upper end of the candle where the current passes between the two carbons. After the current has made the carbons white-hot for some time, the kaolin yields gradually to the intense heat of the descending arc and wastes away with the carbons. To avoid the irregularity of consumption of the two poles (one carbon rod conveys at any given moment the positive current, and the other the negative current), the direction of the currents is changed regularly and rapidly by employing an "alternating" current for producing the arc. This makes each carbon rod alternately positive and negative for equal lengths of time, and produces a like rate of consumption in both of them. No regulator is needed in this device. By a later improvement of the Jablochkoff candle the insulating material between the two rods is dispensed with; it was found that the oppositely-flowing currents in the two carbons repel each other, and that the arc is only formed at the top end of the candle if the two rods are slightly apart from each other.

Formerly most of the arc-lamps burnt only a little longer than half the night. This was remedied by an invention of Mr. Charles Brush, of Cleveland, Ohio. In his lamps two pairs of carbon rods are employed. Matters are so arranged that when the light of the first pair is about to expire, the current is switched into the second pair of carbons. By this means the lamp is made to give light throughout the longest winter nights.

For the development of the incandescent light a great many, and very costly, experiments have been made. Among the prominent experimenters we mention M. Lodyguine, of St. Petersburg, who gained a prize from the St. Petersburg Academy in 1875. His lamp consisted of a stick of carbon inclosed in a glass receiver, from which the air had been exhausted, and then been replaced by nitrogen. It made a good light, but the carbon did not last long. The two experimenters who first achieved success with incandescent lamps are J. W. Swan, of England, and T. A. Edison, of America. Swan patented his lamp January 2, 1880. Edison experimented for some time with platinum wires. But platinum wastes rapidly at white heat, even in a vacuum. Edison, therefore, experimented with carbon filaments rendered hard by heating and cooling them alternately in vacuo. Finally, he adopted a loop made of a filament of very thin bamboo strips. His lamp was patented on September 16, 1880. The Swan carbon filament was made of cotton fiber prepared by a special process and inserted in an arched form in a highly-exhausted glass bulb. In both the Swan and Edison lamps the electric current, being sent through the resisting carbon filament, produces the intense and continuous glow of the incandescent lamp as now used. Mr. Sawyer, of the former Sawyer-Man Company, of New York, and various other electricians have also made experiments in incandescent lighting. With all of them the problem was to produce a carbon filament capable of furnishing a continuous light for, say, 1,000 hours, or more, without any danger of breaking down through lack of homogeneity or in consequence of the gradual wasting away. Most of the Edison and Swan lamps are now guaranteed to last 1,000 hours, if the proper current strength is not exceeded; but many of them have lasted two, three, or four thousand hours. By a recent decision of the United States circuit court of New York the priority of invention of the incandescent light was awarded to Edison.

Careful experiments made lately at the Cornell University, New York, with respect to the efficiency of the arc and incandescent lamps of the best present make have shown that while the arc-lamps convert on an average about 10 per cent. of the electrical energy of the current into light, yet the incandescent lamps do not convert more than about five per cent. of it into light.

The principal companies that furnish arc-lights in America are the Thomson-Houston, Brush, United States, Excelsior, Western Electric, Westinghouse and Sperry Companies. Of the incandescent lighting companies, the Edison Company is foremost; then come the Thomson-Houston, Westinghouse, United States, Jenny and National Electric companies. Arc-lights are especially used in streets, depots, yards and large halls, while the incandescent light is introduced into offices, dwellings, stores and steamers. For light-houses, search-lights and photography, the arc-light is superior to any other. In theatres both kinds are frequently employed.

LIGHTNING, INJURY FROM. Persons struck by lightning, if not instantly killed, are more or less deprived of consciousness for a time, often, no doubt, by fright, in which case the effect is transient, but sometimes in consequence of a shock given to the brain from which as a rule, however, they recover. The treatment should, of course, be directed to the special symptoms, which are liable to great variations, but in all cases the body should be kept moderately warm, to prevent the loss of animal heat to which it is liable when the functions of the brain are suspended or im-

paired, and the lungs inflated so as to imitate the natural respiration as nearly as possible. See *Britannica*, Vol. XV, p. 781.

LIGNITE (called also "wood coal" and "brown coal"), a mineral coal retaining the texture of the wood from which it was formed. See *Britannica*, Vol. VI, p. 46.

LIGONIER, a post-village of Noble county, Ind., situated on the Elkhart River, and on the air-line division of the Lake Shore and Michigan Southern Railroad, midway between Toledo and Chicago. It has manufactories of carriages and furniture.

LILIACEÆ, a natural order of endogenous plants, containing about 1,200 known species. They are most numerous in the warmer parts of the temperate zones. They are mostly herbaceous plants, and the shrubby and arborescent species are mostly tropical. The stem is simple or branching towards the top; the leaves are simple and generally narrow; the flowers are generally large, with six-cleft or six-toothed perianth; the stamens are six, opposite to the perianth; the pistil has a three-celled, many-seeded ovary, and a single style. The fruit is succulent or capsular. This order contains many of our finest garden, green-house and hot-house flowers, as lilies, tulips, lilies of the valley, etc. Many species are useful for food, as garlic, onion, etc.; others in medicine; and some are valuable for the fiber which their leaves yield, as New Zealand flax.

LILLIPUT, the name of a fabulous kingdom which is described by Swift in *Gulliver's Travels*, and whose inhabitants are not greater in size than an ordinary man's finger.

LILY, see *Britannica*, Vol. XIV, p. 643.

LILY, GIGANTIC (*Doranthus excelsa*), of Australia, a plant of the natural order *Amaryllidæ*, with a leafy, flowering stem, sometimes 20 feet high, bearing at the top a cluster of large crimson blossoms. This plant is of great beauty, and the fiber of its leaves is excellent for ropes and for textile fabrics. The name giant lily is also given to a large lily found in the Himalayas.

LILY OF THE VALLEY (*Convallaria*), a genus of plants of the natural order *Liliaceæ*, having terminal racemes of flowers; a white, bell-shaped, or tubular six-cleft or six-toothed perianth; a three-celled germen, with two ovules in each cell, and a succulent fruit. The species commonly known as the Lily of the Valley (*C. majalis*), the *Maiblume* or *Mayflower* of the Germans, grows in bushy places and woods in Europe, the North of Asia and North America, and has a leafless scape, with a raceme of small flowers turned to one side. It is a universal favorite, on account of its pleasing appearance, the fragrance of its flowers and the early season at which they appear. It is therefore very often cultivated in gardens, and forced to earlier flowering in hot-houses. Varieties are in cultivation with red, variegated and double flowers. The berries, the root and the flowers have a nauseous, bitter and somewhat acrid taste, and purgative and diuretic effects. The smell of the flowers when in large quantity, and in a close apartment, is narcotic. Dried and powdered, they become a sternutatory. The esteemed *Eau d'or* of the French is a water distilled from the flowers.

LILLY, WILLIAM SAMUEL, an English writer, born at Fifehead, Dorsetshire, in 1840, and educated at St. Peter's College, Cambridge, graduating senior scholar and classical prizeman. He entered the Indian civil service by open competition; was under-secretary to government in 1869; and was called to the English bar in 1870. He has published *Ancient Religion and Modern Thought*

(1884); *Chapters in European History* (1886); and *A Century of Revolution* (1889).

LIMA, a post-village of Livingston county, N. Y., on Honeoye Creek, four miles south of Honeoye Falls. It is the seat of Genesee Wesleyan Seminary.

LIMITATIONS OF CONTRACTS, ACCOUNTS, NOTES AND CONTRACTS, AND JUDGMENTS UNDER THE STATUTES OF THE DIFFERENT STATES:

States and Territories.	Open Accounts.	Notes and Contracts.	Judg- ments.
Alabama.....	3	6	20
Arkansas.....	3	5	20
Arizona.....	3	4	5
California.....	2	4	5
Colorado.....	6	6	6
Connecticut.....	6	6	17
Delaware.....	3	6	20
District of Columbia.....	3	3	12
Florida.....	4	5	20
Georgia.....	4	6	.....
Idaho.....	4	5	5
Illinois.....	5	10	20
Indiana.....	6	10	20
Iowa.....	5	10	20
Kansas.....	3	5	.....
Kentucky.....	5	6	15
Louisiana.....	3	5	10
Maine.....	6	6	20
Maryland.....	3	3	12
Massachusetts.....	6	6	20
Michigan.....	6	6	10
Minnesota.....	6	6	10
Mississippi.....	3	6	7
Missouri.....	5	10	20
Montana.....	5	8	19
Nebraska.....	4	5	5
Nevada.....	2	6	5
New Hampshire.....	6	6	20
New Jersey.....	6	6	20
New Mexico.....	4	6	15
New York.....	6	6	20
North Carolina.....	3	3	10
North Dakota.....	6	6	20
Ohio.....	6	15	15
Oklahoma.....	3	6	.....
Oregon.....	6	6	10
Pennsylvania.....	6	6	5
Rhode Island.....	6	6	20
South Carolina.....	6	6	20
South Dakota.....	6	6	20
Tennessee.....	6	6	10
Texas.....	2	4	10
Utah.....	2	4	5
Vermont.....	6	6	20
Virginia.....	5	5	8
Washington.....	3	6	6
West Virginia.....	3	10	10
Wisconsin.....	6	6	20
Wyoming.....	3	4	.....

LIMMA, or **LEIMMA** (remnant), in music, an interval which, on account of its exceeding smallness, does not appear in modern practice, but which in the mathematical calculation of the proportions of different intervals is of the greatest importance.

LINCOLN, the capital of Nebraska. Population in 1890, 55,491. See *Britannica*, Vol. XIV, p. 658.

LINCOLN, BENJAMIN, an American general, born at Hingham, Mass., in 1733, died there in 1810. At the outbreak of the Revolution he was very active in organizing the Massachusetts troops. In 1776 he was appointed major-general of the State militia. He commanded the expedition that in 1776 cleared Boston harbor of British vessels. Having reinforced Washington after the defeat on Long Island, and in 1777 brought a new levy of militia to Morristown, he was recommended by Washington for an appointment as major-general in the Continental army. Lincoln served as such with Schuyler against Burgoyne during the next summer, and afterwards was wounded at Bemis Heights, while reconnoitering. In August, 1778, Lincoln was placed in command of the army in the South. He protected the city of Charleston from Gen. Prevost.

In 1780 he was besieged at Charleston by Sir Henry Clinton. After a brave defense against a superior force he had to capitulate, and soon returned to Hingham on parole. But after being exchanged in 1781 he joined Washington again on the Hudson, was with him at the siege of Yorktown, and was deputed by Washington to receive the sword of Lord Cornwallis on his surrender of the British forces. From 1781 to 1784 Lincoln was Secretary of War. After quelling Shay's rebellion in Massachusetts in 1787 he was elected lieutenant-governor, and in 1789 Washington appointed him collector of the port of Boston, which office he held till 1808, when he retired from public life.

LINCOLN, LEVI, an American statesman, born at Hingham, Mass., in 1749, died at Worcester Mass., in 1820. He studied law at Harvard College, and became judge of probate in 1776. He was a member of the State constitutional convention in 1780, of the State Legislature in 1796, and of the State Senate in 1797, and was elected to Congress in 1799. From 1801 to 1805 he was attorney-general of the United States. In 1807-'8 he was lieutenant governor of Massachusetts, and became acting governor in 1809. Lincoln was an original member of the American Academy of Sciences, and was long at the head of the Massachusetts bar.

LINCOLN, LEVI, an American statesman, born at Worcester in 1782, died there in 1868. After graduating at Harvard, he was admitted to the bar at Worcester in 1805. Between 1812 and 1822 he was elected several times to the Legislature, was Speaker of the House in 1822, lieutenant-governor in 1823, and judge of the Supreme Court in 1824. In 1825 Lincoln was elected governor of Massachusetts, for which office he had been nominated by both political parties. He held this office till 1834. In 1835 he was elected to Congress and in 1841 he was made collector of the port of Boston. Upon the reorganization of his native town he was made its first mayor. Lincoln was a member of many historical and scientific societies.

LINCURSTA WALTON, embossed oil-cloth, a material similar to linoleum (see Britannica, Vol. XIV, p. 676), and invented by the same man, Mr. Frederick Walton. This new material is described as a "compressed mass of cellulose, paper, cork, etc., thoroughly impregnated with oxidized linseed oil and resin." It has ground cork and oxidized linseed oil for its basis, the same as linoleum; but is distinguished from the latter by deeper, sharper and more lasting impressions, that means by higher and more lasting relief patterns used as tapestry, with decorations in imitations of ivory, gold, silver, bronze, etc., it is claimed that it can be furnished much cheaper than any other material used for embossed wall decoration. It produces the same general effect as carved work, and can be colored to any desired shade, so as to imitate costly woods, and to give any desired effect to the pattern.

Lincrusta Walton is known in the trade as "gervita", and has very beautiful and attractive patterns in *relievo*. It is applied to walls with glue and paste, similar to wall paper. The valuable properties claimed for it are: It may be roughly scrubbed without injury; it can even be struck with a hammer, as the elastic material will swell out again; it has no glaze to annoy the eye; yet it does not absorb moisture; it is so flexible that it can be carried around corners without injury; it can be removed from a wall and used again in other places. Lincrusta Walton has even been applied to exterior walls with very satisfactory effect. It was found to resist the weather well. But it is mainly used for in-

terior decoration; and for this purpose it has no equal among the cheap materials.

LIND, JENNY, see GOLDSCHMIDT, in these Revisions and Additions.

LINDAU, PAUL, a German author, born at Magdeburg June 3, 1839. He studied philosophy and literature at Halle, Leipzig, Berlin and Paris. He has labored in several departments of literature, but is perhaps best known as a writer of plays and novels. The most successful of the plays has been *Maria und Magdalena*. The novels include *Herr und Frau Beuer* (1882); *Toggenburg* (1883); *Mayo* (1884); and *Im Fieber* (1889). He has edited various journals, including "Die Gegenwart" and "Nord und Süd," both of which he founded.

LINDEN, or LIME. The American Linden (*Tilia Americana*) is a well-known timber tree, often planted along alleys for shade. It furnishes "bast", or bast-bark, equal to its European namesake. This bast is here sold for tying bundles of kindling wood and various other tying purposes, especially in nurseries. Dried linden flowers are often used for making tea which is taken as a sedative. See Britannica, Vol. XIV, p. 648.

LINDSLEY, JOHN BERRIEN, born at Princeton, N. J., in 1822, became in 1850 professor of chemistry in the University of Nashville, and held that chair until 1873, meanwhile founding the medical department of that university, and becoming its dean. He was chancellor of the university from 1855 till 1870, and secretary of the State board of education from 1875 till 1887.

LINDSLEY, NATHANIEL LAWRENCE (1816-1868), a philologist and educator. He was for many years professor of language in Cumberland University, founded Greenwood Seminary, and was associated with Dr. J. E. Worcester in the preparation of his well known dictionary.

LINDSLEY, PHILIP, an American educator, born at Morristown, N. J., in 1786, died at Nashville, Tenn., in 1855. After graduating at Princeton College he became tutor in Latin and Greek there. In 1813 he was made professor of languages and secretary of the board of trustees. In 1824 he became president of the University of Nashville, where he remained till 1850, when he accepted the professorship of archeology and church polity in the Presbyterian theological seminary at New Albany, Ind. Rev. L. J. Halsey collected his many baccalaureate addresses and occasional sermons, and published them as *Dr. Lindsley's Complete Works and a Biography* in 1868.

LINE, an expression used in the British army to distinguish ordinary cavalry and infantry from the guards, artillery, and engineers. It obviously took its origin from the fact that the troops in question constitute the usual "line of battle."

LINEN, see MANUFACTURES, TEXTILE, in these Revisions and Additions.

LING, PETER HENRIK, a Swedish poet, inventor of the "movement cure," born at Ljunga, Smaland, in 1776, died at Stockholm in 1839. After studying theology he wandered through Germany and France, leading an adventurous life. In 1805 he became fencing-master in the University of Lund, and in 1813 at the military school at Carlsberg. His main endeavor was to adapt his gymnastics to the needs of the various parts of the body instead of to the arms only. In 1813 an institution was established at Stockholm which was to embody his ideas and Ling was called to be its director. His success led to his being made a member of the Swedish Academy and receiving various honors from the King. His main poetical works are the *Gylfe* (1812), and *Asarne* (1816-1826). His *Elementary*

Principles of Gymnastics, and other works on the "movement cure" were published after his death.

LINGA (a Sanskrit word which literally means a sign or symbol) in the sectarian worship of the Hindus, the Phallus, as emblem of the male or generative power of nature. Originally of an ideal or mystical nature, it has degenerated into practices of the grossest description; thus taking the same course as the similar worship of the Chaldeans, Greeks, and other nations of the East and West.

LINIMENT, in pharmacy, a liquid preparation for external application. Liniments may be regarded, in so far as their physical properties are concerned, as ointments having the consistence of oil. Chemically, most of them are soaps—that is to say, compounds of oils and alkalis—while others are medicated with powerful drugs, designed to act after absorption.

LINNEA, a genus of plants of the tribe *Lonicereæ*. It contains but a single species *L. borealis*, the twin-flower, found in the more northern regions of Europe, Asia, and North America. It is a small trailing evergreen herb, characterized by lanceolate calyx-lobes, and bell-shaped flowers occurring in pairs.

LINSTOCK, a forked iron-shod wooden staff used in gunnery for holding the lighted match in readiness to be applied to the touch-hole of the cannon.

LINT, the name given to linen cloth when shredded so as to form a soft material suitable for dressing wounds. Lint is now superceded by a cotton cloth specially woven for the purpose, with one side soft and fluffy.

LINTON, MRS. LYNN, an English essayist and novelist, born at Keswick in 1822. In 1858 she was married to Mr. W. J. Linton, the well-known engraver and author. Mrs. Linton is an indefatigable worker. Besides her numerous novels she has done a great deal of magazine work, and at one time was a constant contributor to the "Saturday Review," in which her papers on "The Girl of the Period" attracted much attention. Among the best known of Mrs. Linton's works are *Grasp Your Nettle*; *Sowing the Wind*; *Patricia Kemball*; *The Rebel of the Family*; *Christopher Kirkland*; *Paston Carew*; *Millionaire and Miser*, and *Through the Long Night*.

LINTON, SIR JAMES D., an English water-color and oil painter, born in London, Dec. 26, 1840. After instruction from Mr. Leigh he became an illustrator of not a few books and magazines, in addition to exhibiting pictures at the Dudley Gallery and Royal Academy. His water-color picture *Maudy Thursday* attracted much attention, and for it he received the gold medal of the Philadelphia International Exhibition. As a painter in oils Sir James has also attained success, particularly in historical subjects. In 1884 he was chosen president of the Royal Institute of Painters, and in the following year was knighted.

LINTON, WILLIAM JAMES, an English-American author and engraver, born at London in 1812. He illustrated *Jackson's History of Wood-Engraving*; *The Lake Country*; and *Deceased British Artists*. In 1867 he removed to the United States, settling first at New York and afterwards at New Haven. American magazines have profited by his admirable illustrations. He has greatly improved the art of wood-engraving in this country. Linton has published *Claribel and Other Poems*; *A Life of Thomas Paine*; *The English Republic*; *History of Wood-Engraving in America*; *Golden Apples of Hesperis*; and *Rare Poems of the Sixteenth and Seventeenth Centuries* (1883).

LINUM, a genus of plants of the natural order *Linaceæ*, of which *L. usitatissimum*, the flax of commerce, is the most important species. The genus

includes a number of flax-plants not cultivated for fiber, many of which are ornamental. *L. perenne*, or perennial flax, is a blue-flowered species found in the northern United States, in Europe and in Asia; *L. grandiflorum* is a beautiful annual of Algiers, bearing abundant scarlet flowers. See FLAX, *Britannica*, Vol. IX, pp. 293-98.

LIODON, a genus of extinct marine reptiles, with palatine bones vertical, separated throughout their length; the teeth smooth and compressed; the chevrons articulating with the caudal vertebrae. The original species was described from the Norfolk chalk. Large forms abounded in America during the Cretaceous period.

LIPOGRAM, a species of writing characterized by the exclusion of a certain letter, either vowel or consonant. The earliest known author of lipogrammatic verse was the Greek poet Lasus (born 538 B. C.).

LIPPE, a principality of northwestern Germany. For general article see *Britannica*, Vol. XIV, pp. 683. Latest officially reported area, 475 square miles, with a population in 1885 of 123,212. Capital, Detmold with a population of 8,913.

The budget is arranged for two years. In 1890 the revenue was estimated at 1,038,399 marks and the expenditures at about the same amount. Reigning Prince (Aug. 1, 1891) Waldemar, born April 13, 1814, the second son of Prince Leopold and of Princess Emilie of Schwarzburg-Sondershausen; succeeded to the throne at the death of his brother, Dec. 10, 1875; married Nov. 9, 1858, to Princess Sophie, born August 7, 1834, daughter of the late Margrave Wilhelm of Baden. The heir-apparent is the Prince's brother, Prince Alexander, born January 16, 1881, formerly captain in the Hanoverian army.

The house of Lippe is a younger branch of the ancient family of Lippe, formed in the latter part of the 16th century. The Prince has a civil list amounting to about £10,000, which is stated to be insufficient for the expenses of the court.

LIPPSTADT, a town of Prussia, on the river Lippe, thirty miles from Dortmund. It has manufacturing of spirits, beer, cigars, brushes, ropes, iron, etc. Founded in 1168, it was captured by the Spaniards in 1620, and by the French in 1757. Population, 11,504.

LIPSIUS, RICHARD ADELBERT, a German theologian, born at Gera, Feb. 14, 1830; studied theology at Leipzig, and, after serving there as *privat-docent* and professor extraordinary, was called to fill a chair at Vienna in 1861, at Kiel in 1865, and at Jena in 1871. Lipsius has made important contributions to theological science in the field of dogmatics and the history of dogma, the philosophy of religion, and New Testament exegesis and criticisms.

LIRIA, a town of Spain, situated on a fertile plain, fourteen miles northwest of Valencia. Population, 9,445.

LISBON, the county-seat of Ransom county, N. Dak., situated on the Cheyenne River and on a branch railroad.

L'ISLET, a post-village of L'Islet county, Quebec, Canada, situated on the south shore of the St. Lawrence and on the Grand Trunk Railway, 62 miles below Quebec. It contains an academy, an extensive ship-yard, and has a large trade in lumber.

LIST, FRIEDRICH, a German political economist, born at Reutlingen, Württemberg, in 1789, died at Kufstein, Tyrol, in 1846. In 1817 he was professor of political economy in the University of Tübingen. Afterwards he became a member of the diet of Württemberg, and exposed the corrupt practices of the government, for which he was sentenced to ten months' imprisonment. He escaped to Switzerland.

When he returned, in 1824, he was imprisoned in the castle of Asperg. Allowed to emigrate to America, List settled in Pennsylvania, where he made large purchases of land. He soon became wealthy through the discovery of Anthracite on his land and the construction of railroads through it. For several years he was United States consul at Hamburg and Leipzig. He exerted himself for the promotion of the German commercial union, in which he took a great interest. In 1846 some loss of property so affected his mind that, in a fit of melancholy, he shot himself. His *Nationale System der Politischen Oekonomie* (1841) was translated into English and published by Stephen Colwell (1856).

LISTER, SIR JOSEPH, an English surgeon, born in 1827; graduated at London University in arts in 1847, and medicine in 1852; became a Fellow of the Royal College of surgeons, England, in 1852, and of the Royal College of surgeons, Edinburgh, in 1855. He was successively assistant-surgeon and lecturer on surgery, Edinburgh; regius professor of surgery, Glasgow; professor of clinical surgery, Edinburgh; professor of clinical surgery, King's College Hospital, London, and was made surgeon extraordinary to the Queen. In 1880 he received the royal medal of the Royal Society, and in 1881 the prize of the Academy of Paris for his discoveries in antiseptic treatment in surgery known as "Listerism." He was made a baronet in 1883. See SURGERY, Britannica, Vol. XXII, pp. 678, 679.

LISZT, FRANZ, pianist, composer, and author, born at Raiding, in Hungary, in 1811, died at Baireuth, Bavaria, in 1886. At the age of nine years he displayed so much musical talent that several Hungarian noblemen offered the means for his education at Vienna, where he studied under the best masters, and in 1822 played before enthusiastic audiences. He continued his studies in Paris and played there with success, and in other continental cities, but was less appreciated in England. In 1827 his father died and for a time, until 1831, he morbidly withdrew from the world; but the violin playing of Paganini roused him to emulation and he became for the time the foremost figure in the musical world. In 1847 he was appointed Kapellmeister at Weimar, and honors were showered upon him. In 1861 he resigned this appointment, and in 1865, took minor orders in the Church of Rome, to which he was devoted, and was known as Abbé Liszt. After 1871 he resided principally at Pesth. In 1875 he was made director of the Hungarian Academy of Music. Among Liszt's compositions are: *Fantasias*; *Poemes Symphoniques*; the grand symphonies *Faust*, and the *Divina Commedia*; the two oratorios, *Die Heilige Elizabeth* and *Christus*; several Grand Masses and numerous Variations. He also published a *Life of Chopin* and many articles on modern music. Opinions vary as to the permanent value of much of his work, musical and literary, but his personal influence was irresistible, and the assistance he rendered to other musicians was invaluable.

LITCHFIELD, a manufacturing village and county-seat of Litchfield county, Conn., on the Naugatuck Railroad, thirty miles west of Hartford. It has fine water-power, contains a soldiers' monument, and from 1784 to 1838 was the seat of Judge Tapping Reeve's celebrated law school, Judge James Gould conducting it after the death of its founder. The township contains the villages of Bantam Falls, East Litchfield, Litchfield, Milton and Northfield.

LITCHFIELD, a city and railroad center of Montgomery county, Ill., forty-two miles south of Springfield, on Shoal Creek Basin. It produces coal, has a good grain trade, contains an Ursuline

convent, flour-mills, grain elevators, and car manufacturing and repairing shops. Population, 5,798.

LITCHFIELD, a post-village, the county-seat of Meeker county, Minn., seventy-eight miles west of St. Paul. It has good water-power, a flour-mill and a furniture factory, and is situated in a fertile, undulating country diversified with small lakes.

LITCHI, of Lee-chee (*Nephelium Litchi*), one of the most delicate fruits of China, Cochinchina, and the Malay Archipelago. The tree which produces it belongs to the natural order *Sapindaceæ*, and has pinnate leaves. The fruit is of the size of a small walnut and grows in racemes. It is a red or green berry, with a thin, tough, scaly rind, and a colorless pulp, in the center of which is one large dark-brown seed. The pulp is slightly sweet. The Chinese preserve the fruit by drying.

LITERARY PROPERTY. See PROPERTY, in these Revisions and Additions.

LITHODOMUS, a genus of stone-boring mollusks of the family *Mytilidæ*, known as date-shells from their shape or appearance. Also called *Lithotomus* and *Lithophagus*.

LITHOGRAPHY. The art of lithography is in the main the same to-day as it was twenty years ago. The stones from Solenhofen, in Bavaria, are still preferred to all others. There have been, however, some improvements made in the presses and in the method of placing the drawing upon the stone. In most shaded drawings there are considerable spaces where the desired effects of shading are simile and uniform. These are produced by lines, grains, and stipples. The work of filling in these spaces takes considerable time. In order to save this time the required markings are molded in points or short narrow ridges on one face of a rubber sheet, similar to the working side of a rubber stamp. This molded face is then inked and laid flat upon the stone, while pressure is brought upon the back of the corresponding portion of the rubber sheet. In this way the markings on the inked side are transferred to the stone with much greater rapidity than can be done by handwork. Besides the shadings thus produced are more perfect and regular than shadings drawn on the stone by hand.

Another process by which drawing upon the stone is facilitated, is the employing of the "air-brush." A tube is connected with a bellows worked by the foot. This tube has a fine nozzle through which a continuous current of air is blown out. A smaller tube conveys ink to the aperture of the air-tube. This ink is blown out by the current of compressed air in the form of a fine spray, exactly in the same way as liquids are sprayed out of an atomizer. The drawing is done by the air-brush. As this approaches the stone the line of ink becomes narrow and dark. As it is lifted farther away from the stone, the ink-spray widens, and grows thinner and paler, so that any variety of effect, from the lightest field to the darkest shading, can be readily produced, and with a rapidity far beyond that of the old method of drawing upon the stone. The flow of ink can also be increased or diminished by simple pressure of the fingers, thus rendering it possible to produce very easily uniform fields of specially strong shades or bright light.

The improvements made in the presses are also of great importance. The best known presses in the market are those of Hoe, of Potter, and of Campbell. We cannot describe them here. It is sufficient to say that with the present presses 1,200, and, in some cases, over 1,500 impressions per hour can be made. This was not possible twenty years ago.

The care and skill brought to bear on lithographic work have also been increased during the last fifteen years, so that very striking effects can now

be produced. Crayon work, for instance, can be transferred and prints made that are hardly distinguishable from the original drawing. Small work in colors, as for advertising cards, valentines, etc., has grown into a very important branch of modern lithography. See *Britannica*, Vol. XIV, pp. 697-701.

LITHOLAPAXY, crushing and removing the stone in the bladder. See *Britannica*, Vol. XXIV, p. 190.

LITHOLOGY (*lithos*, a stone), the name sometimes used for that division of geology which considers the constitution and structure of rocks, apart from their relation in time or position to one another.

LITHOPHAGIDÆ (Gr., "stone-eaters"), a term no longer in use, but sometimes formerly applied to the mollusks which bore holes for their own residence in rocks, as *Saxicava*, *Petricola*, etc.

LITHOPHANE, a style of ornamental porcelain impressed with figures which become distinct, with the lights and shadows correctly shown when viewed by transmitted light. The effect is secured by impressing the sheets of porcelain, when in a soft state, with raised stamps of the figures intended to be produced. It is adapted for lamp-shades, fire-side screens, decorative windows, and other transparencies.

LITHOTOMY, cutting for stone in the bladder. See *Britannica*, Vol. XXIV, p. 189.

LITHOTRIY, crushing the stone in the bladder. See *Britannica*, Vol. XXIV, p. 190.

LITIZ, a post-borough of Lancaster county, Pa., on the Reading & Columbia Railroad, twenty-seven miles southwest of Reading. It has several boarding-schools and seminaries; is a place of summer resort, and has manufactories of beer, cigars, flour, and machinery.

LITTELL, ELIAKIM, an American publisher, born at Burlington, N. J., in 1797, died at Boston in 1870. Having learned the printer's trade he established at Philadelphia in 1819 a literary paper entitled the "National Recorder," whose name he changed in 1821 to the "Saturday Magazine." In 1822 he changed it to a monthly, called the "Museum of Foreign Literature and Science." It presented to the American readers selections from the best periodical literature of Europe. After conducting this successfully for twenty-one years he began to publish "Littell's Living Age" in Boston, a weekly literary periodical which is still (1891) continued. He was the author of the "Compromise Tariff" carried through Congress in 1833 by Henry Clay.

LITTLE CHRISTIANS, a Russian sect of seceders from the national church, originating in the bishopric of Tzaritsin in 1868. They profess to have received a divine revelation, practice immersion, but reject all forms and symbols, even to bread and wine in the eucharist.

LITTLEDALE, RICHARD FREDERICK, an author and clergyman, born at Dublin, Ireland, in 1833. After being ordained in the Church of England in 1856 he held a curacy in London for five years, but being obliged by ill health to give up parish work he devoted himself to literary work on ritualism and allied subjects. He published a *Commentary on the Song of Songs; Philosophy of Revivals; Early Christian Ritual; and Misapplied Texts of Scripture* (1870). He also continued and completed J. M. Neale's *Commentary on the Psalms* (1868-1874).

LITTLE FALLS, a post-village, the county-seat of Morrison county, Minn., located on the east bank of the Mississippi.

LITTLE FALLS, a picturesque post-village in Herkimer county, New York, on both sides of the Mohawk River, which here passes through a rocky

gorge and falls forty-four feet in two-thirds of a mile, furnishing fine water power. See *Britannica*, Vol. XIV, p. 708.

LITTLE ROCK, the capital city of Arkansas, and county-seat of Pulaski county, situated on the south bank of the Arkansas River, near the center of the State. It is located on a high bluff, commanding an extensive view down the valley of the river. It has important railroad connections, in addition to its shipping facilities by river. The St. Louis, Iron Mountain and Southern Railroad passes through Little Rock; and the Memphis and Little Rock, the Little Rock and Fort Smith, and the Little Rock, Mississippi River and Texas Railroads terminate here. The city contains the State capitol, State Library, asylums for the blind and the deaf mutes, St. John's Military College, a United States arsenal, a ladies' seminary, the Sherman high-school for white, and the Union high-school for colored pupils; a convent, the Roman Catholic cathedral of St. Andrew, etc. The principal articles of manufacture are flour, castings, wagons, and carriages. Population in 1890, 22,496. See *Britannica*, Vol. XIV, p. 708.

LITTLETON, a post-village, and township of Grafton county, N. H., on the Mink or Ammonoosuc River, twenty-eight miles from Mt. Washington. It is much visited by tourists to the White Mountains. The town has manufactories of woolen goods, axes, scythes, and stereopticon views.

LITRÉ, MAXIMILIAN PAUL ÉMILE, a French philologist, born at Paris in 1801, died in 1881. After studying medicine he devoted himself to literature, translated the works of Hippocrates into French, and published a defense of Comte's philosophy in his *De la Philosophie Positive; and Application de la Philosophie Positive au Gouvernement des Sociétés*. In 1854 he became editor of the "Journal des Savants." His greatest work is a *Dictionnaire de la Langue Française*, which he completed in 1873, after thirty years, arduous labor. It is noted for accuracy in definition and etymology. In 1871 Littré was appointed professor of history and geography in the Polytechnic School, then at Bordeaux, and in the same year he was chosen a member of the Academy. He had before been elected to the Chamber of Deputies, and in 1875 he was chosen senator for life.

LIVADIA, a town of Greece, near the cave of Trophonius, the ancient oracle, sixty miles northwest of Athens. Population 5,000. See *Britannica*, Vol. XVII, p. 808.

LIVERPOOL, a post-village of Onondaga county, N. Y., on the east shore of Onondaga Lake, and on Oswego canal. It has salt-works, and manufactures cigars and willow baskets.

LIVINGSTON, the county-seat of Park county, Mon., situated at a railroad junction on a branch railroad to the National Park.

LIVINGSTON, HENRY BROCKHOLST, an American lawyer, born at New York in 1757, died at Washington, D. C., in 1823. While studying at Princeton, at the outbreak of the Revolutionary war, he left the college to serve as aide to Gen. Philip Schuyler. In 1777 he was major and served as aide to Benedict Arnold, when the latter captured Burgoyne's army. Later on he served again with Gen. Schuyler. In 1779 he accompanied his brother-in-law, John Jay, on his embassy to Spain as private secretary. While returning in 1782 he was captured by a British vessel, and thrown into prison on reaching New York. When Sir Guy Carlton arrived at New York he was liberated. He then continued the study of law, and was admitted to the bar in 1788. He settled in New York after the evacuation of the city, and became one of the most eminent attorneys there. In 1802 he was made judge of the Supreme Court

of New York, and in 1806 he became judge of the United States Supreme Court.

LIVINGSTON, JOHN HENRY, an American clergyman, born at Poughkeepsie, N. Y., in 1746, died at New Brunswick, N. J., in 1825. After studying law he went to Holland to study theology at Utrecht and received his doctorate there in 1767. Then he became pastor of the North Dutch church in New York City, at the corner of Fulton and William streets. During the occupation of New York by the British he preached for some years at Albany, Kingston, and Poughkeepsie in succession. He returned to his pastorate in 1783 after the English army had evacuated New York. In 1807 he became professor of theology and president of Queen's College (now Rutgers), New Brunswick, N. J., which position he held until his death. Mr. Livingston was styled "the father of the Dutch Reformed Church in America."

LIVINGSTON, PHILIP, an American statesman, born at Albany, N. Y., in 1716, died at York, Pa., in 1778. After graduating at Yale College he became a merchant in New York, and was for nine years an alderman of that city. From 1758 to 1769 he was a member of the provincial assembly, in which he steadily opposed all arbitrary measures of the mother country. In 1774 he was delegated to the Continental Congress, then assembled at Philadelphia, and continued to be a member of that body until his death. As such he signed the Declaration of Independence in 1776. Mr. Livingston was liberal to colleges—a professorship of divinity at Yale bears his name as one of its founders—and during the Revolutionary war he sold part of his property in order to sustain the public credit. He was one of the contributors to the building of the first Methodist church in America.

LIVINGSTON, WILLIAM, an American statesman, born at Albany, N. Y., in 1723, died at Elizabethtown, N. J., in 1790. He graduated at Yale at the head of his class, and then studied law with James Alexander and William Smith. Being admitted to the bar in 1748 he soon became one of the leaders of the profession and was known as the "Presbyterian lawyer." In 1760 he purchased land near Elizabethtown, N. J., and there erected a country seat then known as "Liberty Hall," to which he removed with his family in 1772. He was a delegate to the first Continental Congress from New Jersey, and in 1776 was made governor of the State. He held this office until his death. The British made several expeditions for the purpose of kidnapping him, but Livingston was always fortunate in escaping. They dubbed him the "Itinerant Dey of New Jersey" and the "Don Quixote of the Jerseys." He had written largely for the newspapers and many political and miscellaneous tracts.

LIVRE, the name of an ancient French coin, derived from the Roman *libra*. In 1795 the livre was superseded by the franc. Livre was also the ancient French unit of weight, and was equal to about one pound avoirdupois; the kilogram has taken its place.

LLERENA, a town of Spain, eighty-three miles north of Seville. Near here the British and French cavalry fought April 11, 1812. Population about 6,000.

LLOYD'S BONDS: in English law, obligations by railway companies under their seal, purporting to be for work done, or for materials supplied for the purposes of an undertaking, and covenanting to pay the debt and interest thereon. They were devised by an English counsel named Lloyd, to enable railway companies to exceed the powers of borrowing money granted to them by Parliament.

LOAN AND BUILDING ASSOCIATIONS, incorporated companies established for the purpose

of raising, by periodical subscriptions, a fund to assist members to erect and purchase dwelling-houses, or acquire other real estate, which shall be mortgaged to the society until the amount or value of the shares drawn on shall be fully repaid with interest and all other appropriate payments. The associations are organized on the basis of a capital stock divided into shares of an equal fixed amount, and membership is obtained by subscription to one or more of the shares. The usual periodical installment paid for shares of stock is one dollar per share each month. Small fines for non-payment of dues are exacted. When a sufficient sum of money has accumulated from the collection of dues, it is loaned to the stockholder offering the highest premium. There are many different systems under which building societies are conducted. In some the premium is deducted from the loan; in others, the premium is not deducted but is paid with interest in monthly installments. The interest on the money loaned, the interest on premiums, and the fines for non-payment of dues, are the sources of profit. Provision is made in all associations for withdrawing members and borrowers desirous of paying off loans before they are due. A terminating society issues but one series of stock, and when the value of the shares has reached par the funds are divided and the society is dissolved. A "series society" issued stock at regular intervals, bringing in new borrowers and thus keeping up the demand for money. But whatever the system may be, the principle underlying all is the same. The sources of profit to the non-borrowing member are apparent; in estimating the advantages of the borrower there is more to be considered. It must be remembered that he has paid no more "dues" on his stock than the non-borrower, but has had the use of his money for a term of years. The question of profit is whether he has paid an excessive rate for the use of the money. In deciding this it must be understood that however high a premium he may have paid, if he did not exceed the average of premiums, he did not pay a high rate of interest, because when the average premium is high the society runs out sooner and less money is paid on each share for dues. If without capital he has been enabled to secure a home and pay for it in installments, the chances are that he has obtained a fair return for his investment, and if the property while he was paying for it largely increased in value, his profits may be larger than those of the non-borrower.

LOASACEÆ, a natural order of calcifloral exogens, natives chiefly of the temperate and warmer parts of America. There are about seventy known species, herbaceous plants.

LOBAU, a town of East Saxony, twelve miles southeast of Bautzen. It has mineral springs and manufactories of linens, cottons, and woolens. Population, 6,977.

LOBBY, a space surrounding and serving as the entrance to an apartment; a vestibule or anteroom. In the United States it generally means that part of a hall of legislation which is not appropriated to the official use of the assembly, and to which members and their accredited friends have access. The "privilege of the lobby" is sought by persons desirous of influencing legislation, and it has been sufficiently influential to be called "the third house."

In the early days of the lobby ex-members of the Senate or the House were the most available intermediaries between those who wanted certain legislation done and those who had the power to do it. For under the rules they had the right of entrance to the floors of the Senate chamber or the House of

Representatives, and could talk with members in their seats or in the cloak-rooms. They could urge their pet measures, whether they were subsidy schemes or land-grants for railroad companies, etc., in divers ways upon the members to whom they had access as former colleagues.

The professional lobbyist is of later development. He "sees" the members in their committee rooms, preferably in private. For this purpose he gets his pet measure introduced by a member who is already won for it. The latter secures its prompt reference to a friendly committee. The next move is to refer it to a sub-committee of one or three members of the general committee for the ostensible purpose of having it "thoroughly investigated." If the scheme involves a large amount of money, land or vested interests a sub-committee of three is preferable, because its report will carry more weight with the weak members of the general committee. If the lobbyist controls the chairman of the latter committee, he can name the members of the sub-committee.

Lobbyists must be keen and accurate judges of human nature. They must find out how each man can be secured. Many members of Congress can be won through their friends, and are, indeed, daily sold and delivered by their most intimate personal friends, whom they would never suspect of turpitude. A good dinner, banquet or a case of choice wine will capture others whom money could not purchase. It is humiliating to confess, however, that a large majority of the corrupt law-makers are bought with spot cash, many of them being shy of bank-checks, through the presentation of which their action might be traced. Some members have preferred to accept sums of money under the name of "loans," or in the shape of money advanced on "notes without dates," or with some violating clause.

The history of the lobby is a secret one. It reveals itself only in exceptional cases of exposure. The exposures of the "Credit Mobilier" and of the "Pacific Mail Steamship Company Subsidy" show the working of the lobby in our National Capital most vividly. The Credit Mobilier was a combination of men who undertook to build the first trans-continental railway to the Pacific Ocean. Their lobbyists worked upon the individual members of Congress until our national legislature voted money enough to build the entire railroad between Omaha and San Francisco. Charles Francis Adams, Jr., of Boston, has written its history fully and mercilessly. When the exposure and investigation came, several prominent Congressmen were relegated to obscurity and the grave. The country was shocked at the exposure of this gigantic swindle. Official corruption was made very odious. Yet, at that very time, the bill to pay the Pacific Mail Steamship Company a subsidy of \$500,000 annually was quietly being engineered through both houses of Congress. Subsequent investigation showed that it cost the Pacific Steamship Company \$600,000 to get the annual subsidy of half a million dollars granted by Congress.

There is a type of lobbyists whose business is to prevent the introduction, consideration or enactment of measures prejudicial to the powerful corporations who employ and pay them. These are hired attorneys stationed at Washington or the State capitals. Many bills are introduced into our National and State legislatures which have no other purpose than to compel the companies that would be injured by their enactment to extinguish them by purchase. To effect this the last-mentioned kind of lobbyists are employed. They scan every bill relating to the interest of their employ-

ers, and work for the suppression of the injurious ones.

LOBSTER, a genus of Crustaceans, of the order Decapoda, sub-order *Macrourea*, differing from Cray-

fish, to which, in general form and characters, they are very similar, in having the rostrum in front of the carapace not depressed, but straight, and armed with many teeth on each side, and the last ring of the thorax not movable, but soldered to the preceding one. The common lobster, found in great plenty on rocky coasts of America



LOBSTER.

and most parts of Europe, is too well known to require description. The American lobster (*Homarus Americanus*) is larger than the European species. When fully grown, it is from 1 to 2 feet long and weighs from 2 to 15 pounds. It is a voracious animal, and feeds on any kind of animal food. It lives on rocky, gravelly and sandy bottoms, from low water to 20 or 30 fathoms deep, and has a migratory habit, moving rapidly in considerable numbers, the largest and strongest in front, the weakest in the rear. Upon reaching good feeding grounds they scatter and devour the clams, mussels and other food-animals found there.

On the American coast lobster-fishing is an important industry. In Long Island Sound it begins about April 1 and continues till late in autumn, though the principal catch is in May and June. On the coasts of Maine and Massachusetts, whence our winter supply of lobsters comes, this fishery continues nearly all the year round. In Norway the lobsters were formerly caught with wooden tongs, but the American "lobster-pot" is now everywhere employed. This consists of a basket with a funnel-shaped end, the funnel leading downward to a hole by which the lobster can enter, but from which it cannot escape on account of its claws. It is baited with little fishes, then sunk with stones, and its place is marked by a float. Although the catch on the American coast cannot be accurately given, yet it is stated that about a million lobsters are annually sold in Boston alone. The limit of salable size is fixed by the law of Massachusetts at 10½ inches.

In Portland, Me., and at other places of our North Atlantic coast, a large trade in canned lobsters has grown up. The catch for these canneries has recently become so great that it is apprehended that the supply will soon be seriously diminished, unless some restriction be adopted. A few years ago lobsters from 10 to 20 pounds apiece were not uncommon. Now the average weight is from 3 to 6 pounds. On the coasts of Nova Scotia and New Brunswick lobsters existed so abundantly that they have been largely used as manure; of late they are canned, and in some years as many as four million one-pound cans were exported from British America. Over-fishing is diminishing the catch there as well as on our own coast.

LOCAL GOVERNMENT BOARD of England and Wales. This board, first constituted Aug. 19, 1871, under an act passed earlier in the same year, was established to take over all the powers and duties vested in or imposed on the poor law board (which board from that time ceased to exist) under the acts relating to the relief of the poor, the powers vested in or imposed on the home secretary in regard to the registration of births, deaths and marriages, public health, local government, sani-

tary matters, baths and washhouses, public improvements, town improvement, artisans' and laborers' dwellings, returns as to local taxation, and the powers and duties of the privy council with regard to the prevention of disease and vaccination. Since that time its powers have been increased and its sphere and operations extended by many statutes. The board consists of a president and of certain *ex-officio* members, all of whom are members of the government for the time being. The president is assisted by a parliamentary secretary, a permanent secretary and a numerous staff of officers and inspectors, etc. The duties of the department include a general supervision and control of the administration of the poor law, the inspection especially of metropolitan vagrant wards, workhouse schools, and the regulation of infirmaries; and it may authorize the emigration of orphan and deserted children. Its medical department includes a medical inspector and staff for general sanitary purposes, under it being the national vaccine establishment and the animal vaccine lymph station. It may order the appointment by sanitary authorities of medical officers of health and inspectors of nuisances, may constitute a port sanitary authority in certain cases, carry out local inquiries as to special epidemics, and may make orders as to dairies and cowsheds. It inspects alkali works and canal boats. It has certain statutory powers as to bridges and highways. It examines the accounts of boards of guardians and other local bodies, and may make disallowances and surcharges. It may sanction, after due inquiry by members of its staff, the borrowing of loans for cemeteries, sanitary improvements, improvement schemes, workhouse buildings, water supply, bath and washhouses, and for other purposes; and it satisfies itself that any sums advanced by the public works loans commissioners are applied to the work for which they were intended. It grants provisional orders for the constitution or alterations of union and the division of parishes, for the acquisition of land, and for other local objects. It reports to parliament upon local bills, and it publishes periodical returns as to the prevalence and cost of pauperism, sanitary matters, vaccination, local taxation and the valuation of property, and the financial position of the local authorities of England and Wales. It exercises numerous and important functions under the local government act. For example, it determines the number and apportionment of county councillors in certain cases; it may make provisional orders transferring certain powers under local acts to a county council, and the powers possessed by certain government departments and other authorities under general acts to county councils generally; it may, on the application of two or more local authorities, grant a provisional order creating a body capable of dealing comprehensively with the whole of a river under the rivers pollution prevention act; it may grant an order for altering the boundary of any county or borough, or constituting any borough having a population of not less than 50,000 into a county borough or for uniting two county boroughs—all of which provisional orders are subject to confirmation by parliament. Notice of a petition for the grant of a charter of incorporation to a new borough must be sent to it, and any representations it may make are to be considered by the privy council; it may in certain cases arbitrate regarding the amount to be paid by the county council to an urban authority for the maintenance of main roads; it certifies as to the share heretofore received by each county out of the grants in aid of local rates, this being the basis on which the probate duty

grant is to be distributed; it certifies the amount due from county councils in substitution for local grants for poor-law purposes; county councils cannot borrow for certain purposes without its consent; it prescribes regulations as to the creation, issue, etc., of county stock, and it appoints the district auditors who are to audit the county accounts. Under the infectious diseases notification act of 1889 a local authority may not permanently apply it to infectious diseases other than those specifically mentioned in the act without the consent of the board. A water examiner under the board reports on the condition of the water supplied by the eight metropolitan water companies. The powers of supervision and control exercised by the department extend over the metropolitan asylums board. By the census act of 1890 the local government board was to be the central superintending authority in England, and is to prescribe the necessary forms and instructions which are to be prepared and issued by the register-general in reference to the census of 1891.

LOCAL PREACHERS, in the Methodist churches, are laymen, engaged in secular pursuits, and sometimes candidates for admission to the regular ministry, who are formally licensed to preach, and many of them ordained, in order that they may assist the regular itinerant preachers.

LOCAL GOVERNMENT ACT for England and Wales. This act, involving great changes in the laws, and government administration throughout England and Wales, was introduced in the British parliament by Mr. Ritchie, president of British local government board, on March 18, 1888, in an elaborate argument. The bill proposed to establish a council for each county, three-fourths of the members of which would be elected, while the other fourth would be selected, to which councils were to be transferred the administrative power and financial business of the county justices, whose judicial functions would, however, be left untouched. The raising and management of the police in counties was to be placed in the hands of a joint committee of the county council and quarter sessions, but the appointment, control and dismissal of chief constables was reserved to the latter. It was proposed to create district councils in the county, to take the place of local boards and rural and urban sanitary authorities. There was, however, to be no alteration as to the areas of poor-law unions or the election of guardians. There were special provisions as to the metropolis, but these were not put forward as a complete settlement of the great problem of the government of the metropolis; and the Government had, Mr. Ritchie stated, their own proposals to make at some future time, on the line, not of creating separate municipalities throughout London, but of amalgamating throughout the different areas the existing local authorities, and of constituting the county council in connection with large and important district councils, possessing large and important administrative functions. In regard to the question of licensing, the authority to inquire into complaints against licensed houses was to remain with the justices, but that duty would be simply ministerial, and under direct instructions from the county council; each county was to be divided into licensing divisions, with a licensing committee for each, which would be empowered to refuse renewals and to require the closing of licensed houses on Sundays, Good Fridays and Christmas days. In cases where renewals were refused compensation was to be given, based on the difference in value between the house with and without a license, this compensation to be in the first instance payable out of the

county fund, but to be paid ultimately, unless in special cases the council should otherwise direct, by the licensing division in which the premises were situate. On the other hand, the councils were to be empowered to increase the license duties by 20 per cent., which it was estimated would produce £800,000 a year. The second reading of the bill was agreed to April 20, 1888, after an earnest debate, in which it was charged with powerful emphasis that the great blot of the bill was the entire exclusion of the poor-law system—the government replying that the inclusion of so difficult and complicated a subject would have so overloaded the measure as to endanger its passage. An instruction, moved by Mr. F. Stevenson on the committee stage, for the insertion of provisions for the reform of parish vestries, was negatived by 229 to 183. In committee an amendment of Mr. Stansfeld, proposing that all councillors should be elective, and that there should be no aldermen, was opposed by the government, and negatived by 250 to 214. The words "county aldermen" were substituted for the expression "selected councillor." Mr. Ritchie asserted to a considerable extension of the list of boroughs dealt with as separate counties. On June 12th the right honorable gentleman announced that, having regard to the opposition with which the licensing clauses were threatened, and to the fact that there remained only about two months before the ordinary date for bringing the session to a close, the government had decided not to ask the house to proceed with them. The proposals in reference to district councils were also withdrawn. An amendment of Mr. Heneage, vesting the control of the police in the county councils, was rejected by 264 to 218. Sir W. Barttelot proposed that the entire control of the police should remain, as heretofore, in the hands of the county magistrates, but this being opposed by the government, was rejected by 366 to 77. Mr. John Morley then moved to omit the words which left the appointment, control and dismissal of chief constables in the hands of quarter sessions, and his motion was carried against the government by 246 to 216. A promise that facilities should be afforded for the discussion of Mr. Stevenson's Sunday closing bill satisfied certain Liberal Unionists who had objected to the withdrawal of the Sunday closing clause, and the committee decided to omit the clause by a majority of 275 to 213. Subsequently the clause empowering the councils to impose an extra license duty of 20 per cent. was struck out by a majority of 199 to 137. An amendment by Mr. J. Rowlands, to the effect that there should be no selected councillors in the county of London, was rejected by 192 to 148. An amendment of Mr. J. Stuart, giving the London county council the same powers, duties and liabilities with respect to the police as are vested in the watch committee of a borough under the municipal corporations act 1882, was opposed by the government, and rejected by 220 to 150. An amendment of Mr. Pickersgill, depriving the courts of aldermen and common council of their judicial patronage, was supported from all quarters of the house, and acquiesced in by the government. A proposed new clause by Mr. Channing, providing that any rates made under the act by the county council might be divided between the owner and occupier, was objected to by the government (who pointed out that if it were adopted the reconstruction of the bill would become necessary, but promised to consider how they could in future best deal with the question), and rejected by 259 to 174.

When the bill reached the house of lords the second reading was passed without a division, after

some hostile criticisms by the Earl of Carnarvon; and after several changes had been made, among them being the insertion of a provision permitting the recorder of London to be appointed the court of aldermen, subject to the condition that he should not exercise judicial powers, unless appointed by the crown to exercise them.

When the bill was returned to the house of commons the changes made by the house of lords were accepted, and the bill received the royal assent Aug. 13, 1888.

The new act provides as follows:

A council shall be established in every administrative county as defined by this act, and be intrusted with the management of the administrative and financial business of the county, and shall consist of the chairman, aldermen and councillors. Three-fourths of the members of this council (the councillors) are to be elected by the burgesses and electors throughout the county, the other fourth (the county aldermen) are to be selected by the councillors. The county council is to be conducted and elected, and is to conduct its proceedings in like manner, and be in the like position in all respects, as the council of a borough divided into wards. Clerks in holy orders and other ministers of religion are not disqualified for being elected and being aldermen or councillors, and a person is qualified who, though not qualified in manner provided by the municipal corporation act 1882, as applied by this act, is a peer owning property in the county, or is registered as a parliamentary voter in respect of the ownership of property situate in the county. The county councillors are to be elected for a term of three years, and are then to retire together. The county is to be divided into electoral divisions, each returning one councillor. The electors of the county councillors are to be, in a borough, the burgesses enrolled in pursuance of the municipal corporations acts, and elsewhere the persons registered as county electors under the county electors act 1886 (see Sec. 12). The chairman of the council (who is not to be called mayor) is to be appointed by the council from amongst their number, and is by virtue of his office to be a justice of the peace for the county. There is to be transferred to the county council all business done by the quarter sessions in respect of the following matters: The making, assessing and levying of a county, police, hundred and all rates, and the application and expenditure thereof, and the making of orders for the payment of sums payable out of any such rate or out of the county stock or county fund, and the preparation and revision of the basis or standing for the county rate; the borrowing of money; the passing of the accounts of and the discharge of the county treasurer; shire halls, county halls, assize courts, judges' lodgings, lock-up houses, court houses, justices' rooms, police stations and county buildings, works and property, subject, as to the use of buildings by the quarter sessions and the justices, to the provisions of the act respecting the joint committee of quarter sessions and the county council; the licensing under any general act of houses and other places for music or for dancing, and the granting of licenses under the race-courses licensing act, 1879; the provision, enlargement, maintenance, management and visitation of and other dealings with asylums for lunatic lunatics; the establishment and maintenance of and the contribution to reformatory and industrial schools; bridges and roads repairable with bridges, and any powers vested by the highways and locomotives (amendment) act, 1878, in the county authority; the tables of fees to be taken by and the costs to be allowed to any inspector, analyst or person holding any office in the county, other than the clerk of the peace and the clerks of the justices; the appointment, removal and determination of salaries of the county treasurer, the county surveyor, the public analysts, any officer under the explosives act, 1875, and any officers whose remuneration is paid out of the county rate, other than the clerk of the peace and the clerks of the justices; the salary of any coroner whose salary is payable out of the county rate, the fees, allowances and disbursements allowed to be paid by any such coroner, and the division of the county into coroners' districts, and the assignment of such districts; the division of the county into polling districts for the purposes of parliamentary elections, the appointment of places of election, the places of holding courts for the revision of the lists of voters, and the costs of and other matters to be done for the registration of parliamentary voters; the execution as local authority of the acts relating to contagious diseases of animals, to destructive insects, to fish conservancy, to wild birds, to weights and measures, and to gas meters, and of the local stamp act, 1869; any matters arising under the riot (damages) act, 1866; the registration of rules of scientific societies; the registration of charitable gifts under 52 Geo. III, ch. 102; the certifying and holding of places of religious worship under 52 Geo. III, ch. 155; the confirmation and record of the rules of loan societies under 3 and 4 Vict., ch. 110; and any other business transferred by this act.

On any vacancy occurring in the office of coroner for a county, the county council is in future to appoint a fit person, but a person holding this office may not be an alderman or councillor for the county for which he is coroner.

The county councils are to have power to purchase or take over existing bridges not being at present county bridges, and to erect new bridges; and there is to be transferred to them the business of the justices of the county out of sessions in respect of the licensing of houses of public entertainment, the performance of stage plays, and of the execution of the local authority of the explosives acts, 1875. There is reserved to quarter sessions business in relation to appeals against the basis or standard for the county rate, or against that or any other rate, and all business not transferred by the act. The powers of quarter sessions with respect to the county police are to be exercised through a standing joint committee of the quarter sessions and county council, but nothing is to affect the powers, duties and liabilities of the justices as conservators of the peace, or the obligation of the police to obey their lawful orders given in that behalf.

The local government board is empowered to make from time to time a provisional order (which is subject to confirmation by parliament) for transferring to county councils certain powers of the privy council, the secretary of state, the board of trade, the local government board, the education department or any other government department conferred by or in pursuance of any statute and appearing to relate to matters arising within the county, and to be of an administrative character.

The entire maintenance of main roads is vested in the councils, though an urban authority may claim to retain the powers and duties of maintaining and repairing a main road within its district, and the council is to make an annual payment towards the cost of the same; the council and any district council may contract for the undertaking by the latter of the maintenance, repair, and other dealing with any main road, and the county council is empowered to contribute to the cost of maintenance, repair and improvement of any highway or public pathway in the county, although the same is not a main road.

The county council is to have power, in addition to any other authority, to enforce the provisions of the rivers pollution prevention act 1876, in relation to so much of any stream as is situate within any part of their county; to oppose bills in parliament, to make by-laws, and to appoint a medical officer of health.

The proceeds of the duties on local taxation licenses are, after the financial year ending on the 31st day of March, 1889, to be paid by the commissioners of inland revenue into the Bank of England to the local taxation account, and the amount ascertained to be the proceeds of the duties collected in each administrative county is to be paid to the council of each county. The license duties referred to are those for the sale of intoxicating liquors by retail, to deal in game, for beer dealers, spirit dealers, sweets dealers, wine dealers, refreshment house keepers, dogs, killing game, guns, appraisers, auctioneers, tobacco dealers, carriages, trade carts, locomotives, horses and mules, horse dealers, armorial bearings, male servants, hawkers, house agents, pawnbrokers, and plate dealers.

The county councils are also to receive four-fifths of one-half of the probate duties. The probate duty grants is to be distributed in proportion to the share received by each county during the financial year 1887-88 out of the grants heretofore made in aid of local rates, which will cease to be granted after the passing of this act (see Finance, National). All sums received by county council in respect of these duties or the probate duty grant are to be applied in paying the costs incurred in respect thereof, or otherwise chargeable thereon; in payment of the sums required to be paid in substitution for local grants, and of the grants required to be made in respect of costs of union officers; and in repaying to the general county account of the county fund the costs on account of general county purposes for which the whole of the area of the county is liable to be assessed to county contributions; provision is also made for the application of the surplus, if any.

The sums to be paid by the county councils in substitution for local grants are, towards the remuneration of teachers in poor law schools, to public vaccinators, school fees for pauper children, to public health officers, to public elementaries outside the schoolhouse; to every local authority by whom a medical officer of health or inspector of nuisances is paid one-half of the salary of such officer; towards the remuneration of registrars of births and deaths; four shillings per week towards the maintenance of each pauper lunatic; for compensation payable to certain county officers; and one-half of the costs for the pay and expenses of the police—in the case of the Metropolitan police the various county funds are concerned having to pay to the receiver of police in each year a sum bearing such proportion to the sum actually raised in the same year by rates from the parishes in that county for the said purpose as the Secretary of State certifies to be the proportion which would have been contributed out of the Exchequer under the arrangement in force during the financial year next before the passing of the act. Each of the following boroughs is for the purposes of the act to be an administrative county of itself: *i. e.*, Barrow, Bath, Birkenhead, Birmingham, Blackburn, Bolton, Bootle, Cumnor, Lincoln, Bradford, Brighton, Bristol, Burnley, Bury, Canterbury, Cardiff, Chester, Coventry, Croydon, Derby, Devonport, Dudley, Exeter, Gateshead, Gloucester, Great Yarmouth, Halifax, Hanley, Hastings, Huddersfield, Ipswich, Kingston-upon-Hull, Leeds, Leicester, Lincoln, Liverpool, Manchester, Middlesbrough, Newcastle-upon-Tyne, Northampton, Norwich, Nottingham,

Oldham, Plymouth, Portsmouth, Preston, Reading, Rochdale, Saint Helen's, Salford, Sheffield, Southampton, South Shields, Stockport, Sunderland, Swansea, Walsall, West Bromwich, West Ham, Wigan, Wolverhampton, Worcester, York.

The mayor, aldermen, and burgesses of each county borough are, subject to certain modifications, to have all the powers of a county council under the act, in so far as they are not already in possession of or subject to the same, but they will still be governed in many respects by the municipal corporations act; and the provisions of the local government act with respect to the constitution, election, proceedings, or position of the county council or the chairman thereof, of the county treasurer and other county officers, the standing joint committee of the justices and the council, coroners, gas meters, the transfer to the council of powers relating to county and other rates, and the preparation or revision of the basis or standard for the county rate, are not to apply to county boroughs. Nor is part IV of the act, relating to finance, to apply, save so far as is expressly provided. Provision is made for an adjustment of the financial relations between counties and county boroughs by agreement or by the commissioners appointed under the act. A quarter-session borough not being a county borough, but containing a population of 10,000 or upwards, is to retain its powers as local authority under any act (save as in this act expressly mentioned), and under the municipal corporations act, but, subject to these provisions and to other savings, the borough is to form part of the county for the purposes of the act. In the case of quarter sessions boroughs of a population of less than 10,000, or in the case of a borough of a population of under 10,000, provision is made for transferring to the county council several of the powers and duties those boroughs at present enjoy.

[Here follow the clauses of the new act relating to the "Metropolis" or County of London, *q. v.*, in these Revisions and Additions.]

Part IV of the act enables a county council, with the consent of the local government board, to borrow, for purchasing any land, or building any building authorized by any act, for any permanent work which they are authorized to execute or do, for making advances in aid of the emigration or colonization of the inhabitants of the county, with a guarantee for a repayment of such advances from any local authority in the county, or the government of any colony; and for any purpose which quarter sessions or county council are authorized to borrow; but where the total debt of the county council exceeds, or if the proposed loan is borrowed will exceed, the amount of one-tenth of the annual ratable value of the property in the county, the amount shall not be borrowed except in pursuance of a provisional order made by the local government board, to be confirmed by parliament. Loans under this section are to be repaid within a period not exceeding thirty years; an annual budget is to be submitted to each county council. The supplemental provisions of the act include certain regulations for bicycles, etc. The first election of county councillors was appointed for January, 1889, and the county councillors elected at the first election are to retire on the ordinary day of election in November in the third year after the passing of the act; and of the first county aldermen, one-half, to be determined by ballot, are to retire in November in the third year after the passing of the act, and the remaining half are to retire in November in the sixth year. The members of the county council first elected are not to enter on their ordinary duties until the first day of April, but are to meet on the second Thursday after the election, on the first or next day, and act as a provisional council to bring the act into operation, to select the county aldermen, and to choose a chairman.

LONDON GREAT TOWER, the name applied to a proposed new structure in the London metropolis. In the autumn of 1889 a project was set on foot for the erection of a great exhibition tower in London, to out rival the Eiffel Tower at Paris. In October designs and estimates were invited for a structure not less than 1,200 feet in height, to be in by the end of February, 1890. The specifications which were ultimately prepared for the tower allowed very wide scope as to the selection of material; but if steel was to be used, it was stipulated that the structure should be able to withstand a wind pressure of 56 pounds to the square foot. In the spring of '90 the whole of the designs were publicly exhibited in Drapers' Hall, Throgmorton street, E. C. There were sixty-eight for competition, besides eighteen sent in as suggestions. The structures in design ranged from 1,000 to 2,000 feet in height. Wembley Park is stated to be the site for the tower; it is situated about two miles beyond Willesden. Under date June 17 the jurors

published their award. This design is octagonal, 300 feet across at the base, tapering to 40 feet at a height of about 1,100 feet; total height 1,200 feet. Utility has much to do with the idea, an extensive hotel with baths and a hall of 20,000 feet area being on the first stage, 200 feet high; the next stage has a hall of 10,000 superficial feet, and is 500 feet high; the third stage another of 3,300 feet at a height of 850 feet; and the fourth, or highest stage open to the public, a covered area of 5,000 feet in two floors, and a sun room of 2,000 feet. The design is Oriental, and the cost above foundations is estimated to be \$1,761,135.

LONDON, METROPOLIS OF. For general article on LONDON, including map, see *Britannica*, Vol. XIV, pp. 818-851. The following figures, reported in "Whitaker's Almanac" (London, 1891, edited by Joseph Whitaker, F. S. A.), gave the area and population within various boundaries as follows:

London Within Various Boundaries.	Area in Statute Acres.	Population 1881.
Within the register-general's tables of mortality.....	75,334	3,816,488
Within the limits of metropolis local management act (1887).....	75,432	4,215,192
London school board district.....	75,462	3,834,354
City of London within the municipal and parliamentary limits.....	668	50,652
Central criminal court district.....	268,391	4,457,102
Metropolitan parliamentary boroughs (exclusive of the City of London).....	45,173	3,403,973
Metropolitan Parliamentary Boroughs (including the City of London).....	45,841	3,454,625
Metropolitan police district (not including the City of London) (population 5,590,376).....	446,024	4,716,009
Metropolitan and city police districts..	441,559	4,766,561

The metropolitan police district extends over a radius of 15 miles from Charing Cross, exclusive of the City of London—588.31 square miles—with a rateable value of £34,742,779. The number of new houses built since 1849 is 513,278, with 3,132 in course of erection; the new mileage being 1,858½; total length patrolled, 8,335.

The *Statesman's Year Book* for 1891 (London, edited by J. Scott Keltie, librarian of the royal Geographical Society) reports the population of the registration district (covered by register-general's tables of mortality) for July 1, 1890, at 4,421,661.

The official estimate (for 1889) of the population of "London Proper"* stated the aggregate as 4,351,738. The night population of the old City of London, on April 4, 1881, the date of the general census, was only 50,652; at the general census of 1871, it was 74,891. It is now said to be still decreasing. The day population, in 1881, was 261,061. At this writing the population for 1891, though taken, has not been officially announced.

The salary of the lord mayor of London is \$50,000; his municipal administration is to the old city. Other officers of the old city receive salaries as follows: Recorder, \$17,500; town clerk, \$15,000; common sergeant, \$11,250; judge, \$16,000; assistant judge of mayor's court, \$6,000; chamberlain, \$12,500; police commissioner, \$10,000; comptroller, \$7,500; remembrancer, \$10,000; solicitor, \$10,000; coroner, \$4,665; architect, \$7,500; head master of London school, \$5,000; mayor's registrar, \$5,000; chamberlain principal clerk, \$6,000; city court registrar, \$5,000; collector of coal market, \$4,000; medical officer, \$6,000; medical officer of port of London, \$4,500; principal of Guild Hall School, \$5,000.

The income of the city of London for the year 1889 was \$2,360,815; the expenditure was about

\$200,000 less. Nearly one-half of the receipts were derived from rents. The following table furnishes the official figures (balance sheet) showing the sources of income for 1889, and the various items of expenditure for the same year:

INCOME.

Balance in hand 31st Dec., 1888.....	£ 55,360
Rents and quit-rents.....	159,101
Renewing fines.....	2,139
Interest on government securities.....	1,864
Interest on city bonds.....	1,548
Income tax retained.....	2,352
Markets, viz.:	
Metropolitan cattle market, Islington.....	30,235
London central markets, Smithfield.....	97,172
Leadenhall.....	7,430
Farringdon and Smithfield (Hay) Market.....	2,079
Billingsgate.....	24,675
Metage of corn, fruit, etc.....	1,630
Mayor's court fees (gross).....	9,072
Judiciary fees.....	1,700
Grant in aid of pauper lunatics, etc.....	457
Reimbursement on criminal prosecutions.....	1,390
" on office of coroner.....	1,300
" wages to workmen, etc.....	4,349
Officer's surplus fees and profits.....	12,321
Transfers, expenses in Parliament, remembrancer's suspense account.....	4,107
Sale of premises and securities.....	3,975
Loans raised.....	15,498
Casual, sundry and incidental receipts.....	67
Cash from reserve fund.....	
(Sundry small sums omitted on both sides are included in the totals.)	
Total income.....	£472,061

EXPENDITURES.

Expenses of civil government.....	£ 60,766
Donations, pensions, etc.....	79,540
Educational expenses.....	12,181
Administration of justice (criminal).....	7,150
Office of coroner (gross).....	2,344
City Library, Museum, Fine Art Gallery and New School of Music.....	5,694
Collection and management, rates, &c.....	25,921
Charges on markets, viz.:	
Billingsgate.....	19,492
Metropolitan cattle market, Islington.....	36,824
London central markets, Smithfield.....	90,411
Other Markets, &c.....	9,650
Charges: Metage and broker's rents.....	1,848
Expense of magistracy and police.....	35,008
Enlargement of Pauper Lunatic Asylum.....	3,453
Sanitary expenses, port of London.....	2,969
Enlargement of Leadenhall Market.....	2,665
Remembrancer's office suspense account.....	4,700
Parliamentary expenses.....	1,177
Contribution to Pauper Lunatic Asylum.....	1,405
Reception of H. I. M. The Shah of Persia.....	3,048
Works at London central markets.....	12,024
Erection of new offices for mayor's court.....	2,331
Erection of buildings opposite Billingsgate.....	7,502
Holburn valley improvement, discharge of debt.....	32,497
Expenses of West Ham Park.....	1,172
Miscellaneous expenditure.....	10,501
Balance in hand on 31st Dec., 1889.....	50,771
Total expenditures.....	£472,061

The metropolis, as defined by the new local government act of 1888, is defined to be hereafter an administrative county of itself by the name of the administrative county of London. The area in question forms part of the counties of Middlesex, Surrey, and Kent, which part is now to be severed from those counties, and is to have a lord-lieutenant, a sheriff, a commission of the peace, and a court of quarter sessions of its own; though for the purpose of the jurisdiction of the justices under such commission and of such county, as well as for other non-administrative purposes, the City of London may continue a separate county, with its own sheriffs, who are, however, no longer to be jointly sheriff of Middlesex. The number of county councilors for the administrative county of London is to be 118, or double the number of members (59) returned by the Parliamentary boroughs in the metropolis; each borough or each division thereof being an electoral division for the purposes

* Statesman's year book.

of the act; the number of county aldermen in the county of London is not to exceed one-sixth of the whole number of the county councillors; the powers, duties and liabilities of the metropolitan board of works are to be transferred to the London county council, and the board is to cease to exist. The metropolitan police remain under the control of the home secretary, the city is placed in the position of a quarter-sessions borough, and retains control of its own police; the common council, and in any other part of the metropolis the district board, may claim to retain the power of maintaining and repairing the main road. The sheriffs of the City of London are not to have any authority except in the city, and a sheriff is to be appointed by the crown for that part of Middlesex which is outside the county of London. The London county council may petition her majesty, to appoint a barrister of not less than ten years' standing to be paid chairman or deputy chairman, or one of the paid deputy chairmen, as the case may be, of the quarter sessions for the county of London. The rights claimed by the court of common council to appoint to the offices of common sergeant and judge of the city of London court are to cease, and in any future vacancy in each of the said offices, the Queen is to appoint a duly qualified barrister to be such common serjeant or judge; and from and after the next vacancy no recorder is to exercise any judicial functions unless he is appointed by her majesty to exercise such functions. The London county council is to pay to each poor law union within its limits such sums as the local government board may certify to be due from time to time in substitution for local grants towards the remuneration of poor law medical officers, and towards the costs of drugs and medical appliances, and is also to grant to such unions 4d. per head per day for every indoor pauper. The London county council may from time to time appoint any fit person to be deputy chairman, and to hold office during the term of office of the chairman, and may pay to such deputy chairman such remuneration as they may from time to time think fit.

"THE CITY OF LONDON."—That small part of the great metropolis known under this name, and presided over by the lord mayor, is now divided into 27 wards, including Bridge Without. There is an alderman for this ward, but no freemen and no common councillors. Each of the other wards, with the exception of the two Cripplegate wards (which return an alderman jointly), elects one alderman and a number of common councillors varying from four to 16, but amounting in all to a total of 232. An alderman is elected when a vacancy occurs, and holds office for life; the councilmen are elected on St. Thomas's Day, and hold office for one year, but are of course eligible for re-election. The electors are in each case freemen, who may have obtained their freedom by birth, apprenticeship, purchase, or gift; but who must be rated householders before they can vote at a ward-mote, as a meeting of the ward is termed. A liveryman is a freeman who, by payment of a fee, has entered the livery of one or other of the city companies or guilds, and was first so called because he was entitled to wear the livery of his company. He has the right to vote at the elections of lord mayor, sheriffs, chamberlain, and other corporation officers, and also for M. P.'s for the city. The lord mayor is elected on Sept. 29 by the liverymen of the several companies assembled together at the Guildhall, and, as it is termed, in Common Hall, and to be eligible he must have served as sheriff of London. The livery may select any alderman thus qualified, but they almost invariably accept the names of the

two senior aldermen who have not passed the civic chair. These two names are submitted to the general body of the aldermen, who choose usually the first, but sometimes, for a special reason, prefer the second. The lord mayor elect is presented to the lord chancellor to receive the assent of the crown to the election; he is sworn before the retiring lord mayor and aldermen on Nov. 8, and on Nov. 9 he goes in procession to the royal courts of justice to be presented to the lord chief justice and again sworn. The mayoralty thus commenced lasts a year, but the same alderman has in some instances been re-elected for a second, and in ancient times for even a third period of service.

LOCH LONG, a well-known lake in the west of Scotland, extending northward from the Firth of Clyde for about twenty-four miles between the counties of Argyll and Dumbarton. It has an average breadth of about a mile; and its banks, consisting for the most part of steep acclivities, abound in striking and picturesque scenery.

LOCK. See Britannica, Vol. XIV, pp. 744-751. It is a fact well established that American locks are superior to European locks of the same price. Locks for ordinary use are here made in large factories. Parts intended for like purposes are made exactly alike for the locks of the same size, and are therefore exchangeable. It has long been a problem before American lock-makers to produce an unpickable lock. Doctor Andrews of Perth Amboy, N. J., approached success in 1841, when he invented a "permutation" lock, in which a number of rings attached to the key permitted an endless variety of combinations. When the bolt of this lock was turned, it was necessary to have exactly the same combination of the key, else the lock could not be moved. This lock had tumblers and a detector, the latter preventing the bolt from being released by the tumbler if lifted too high. Although greatly admired, this lock was picked by Mr. Newell, of New York.

A lock with two sets of tumblers was produced in 1843, and \$500 was offered to any one who could pick it. Messrs. Pettitt and Hall, of Boston, picked it by the smoke process. This is a burglar's device, in which a smoky flame is blown into the key-hole, leaving a film of lampblack on the tumblers. Then a key is introduced. After its removal a strong light is thrown into the key-hole by a reflector. This shows the marks of the key on the tumblers. Thus the proper shape of the key is indicated.

Lockmakers tried next to keep the interior of the lock from view by making the key hole small, and interposing a curtain. The London World's Fair of 1851, brought this lock problem into special prominence. The celebrated "Bramah" lock, which had long defied pickers in spite of a standing offer of 200 guineas, was readily picked by Mr. Hobbs of Boston. In his turn he offered the "Parautopic" lock, invented by Mr. Pyes, its distinctive feature being the use of eccentric rings and a curtain. The English locksmith tried in vain to pick it, but it was picked in 1855 by an American, Linus Yale, Jr., of Philadelphia.

In 1843 Linus Yale, Sr., had invented a lock which was deemed absolutely unpickable until it was picked by his son. There was by this time a considerable excitement on the subject of locks. The younger Yale had declared that any lock using a key of a winged form, which rubs an impression on tumblers, can be picked. To prevent this possibility he invented in 1851 a lock which he called the "magic" lock, and which has never yet been picked. The key of this lock and its bits, though they are seemingly in one piece, are separable. On inserting the key into the lock the bits are taken off by

a pin. When the key is being turned, it puts in motion a set of wheels. These wheels carry off the bits to a remote part of the lock, out of the reach of picking tools, where they act upon the tumblers and arrange them for the drawing of the bolt. Meanwhile the wheels close up the key-hole. Afterwards the bits return and rejoin the key-handle.

Another unpickable lock of American manufacture is the Hall "rotary combination" lock. This lock dispenses with a key. It is opened by turning a knob first one way and then the other a certain number of degrees, according to a set of numbers which the operator has to keep in his mind. The only unpickable English lock is one invented in 1852 by Denison, the celebrated London lock-maker. It has a very narrow key-hole, and is locked by turning a handle; but it needs a key to open it. It is not much in use; the one mostly used in England is an improved Chubb's lock, which had been picked by Mr. Hobbs, of Boston, before he picked the Bramah lock. The puzzle, letter, and dial locks are now out of date. These could only be opened by setting a number of rings to a certain combination of letters. Hobbs showed that they could all be picked. Besides the difficulty of handling them and the danger of forgetting their respective combinations have made them unpopular. Regarding the "Yale time-lock" now in use, see *Britannica*, Vol. XIV, p. 751.

Since 1851 the American locks have sustained their reputation. Mr. Denison himself admits that "American locks are vastly superior to those of English make, and that on the whole the United States are far ahead of England in good and cheap locks."

LOCKE, DAVID ROSS, an American humorist, born at Vestal, Broome county, N. Y., in 1833. In his youth he learned the printer's trade. After being connected with several papers in Ohio, he became successively editor of the *Plymouth* ("Advertiser," the *Mansfield Herald*, the *Bucyrus Journal*, and the *Findlay Jeffersonian*.) While editing the "Jeffersonian," he began in 1860 to insert letters under the name of "Petroleum V. Nasby," purporting to come from an unlettered Kentucky Democrat who wanted untaxed whisky, the perpetuation of slavery, and desired to be postmaster at the "Cross-Roads." These letters became very popular. In 1865 Locke became proprietor and editor of the "Toledo Blade," in which he satirized President Johnson's method of reconstructing the Southern States. In 1871 he removed to New York and became managing editor of the "Evening Mail," but he returned to Ohio after a few years. Mr. Locke has published *Divers Views; Opinions, and Prophecies of Yours Truly* (1865); *Swingin' Round the Circle; Nasby in Exile*, and many political, social, and literary pamphlets. He died in 1888.

LOCK HAVEN, a city, the county-seat of Clinton county, Pa., pleasantly situated in a mountain valley on the south bank of the west branch of the Susquehanna. It is on the Philadelphia and Erie Railroad, at the junction of the Bald Eagle Valley branch of the Pennsylvania Railroad, and on the west branch canal. Lock Haven does a large business in making and shipping pine lumber. It contains a State normal school, large foundries and tanneries, saw-mills, planing-mills, and machine shops. Population, 7,350.

LOCKPORT, a post-village of Will county, Ill., thirty-three miles southwest of Chicago, on the Chicago, Alton & St. Louis Railroad.

LOCKPORT, a city of New York. Population in 1890, 16,003. See *Britannica*, Vol. XIV, p. 764.

LOCKWOOD, DANIEL N., of Buffalo, N. Y., a lawyer, born in Hamburg, N. Y., June 1, 1844. He

graduated at Union College, Schenectady, N. Y., in 1865, and entered the profession of law in 1866. In politics he is a Democrat. He was elected district attorney of Erie county, N. Y., in 1874, and served three years; was elected a Representative from the 32nd Congressional district of New York to the 45th Congress. In 1890 he was elected from the same district to the 52nd Congress.

LOCKUP, a room or place in which persons under arrest are temporarily confined.

LOCKYER, JOSEPH NORMAN, an English astronomer, born at Rugby, in 1836. He was educated partly in Germany and entered the British war office in 1857. In 1860 he became a fellow of the Royal Astronomical Society, and in 1869 he was elected to the Royal Society. He was chief of the expedition sent to Sicily in 1870, to observe the solar eclipse, and again of that to India in 1871. In 1874 he became editor of "Nature." Lockyer has published *Elementary Lessons in Astronomy; Contributions to Solar Physics; The Spectroscope; Studies in Spectrum Analysis, and Star-Gazing, Past and Present* (1878). He was awarded the Janssen prize for astronomy by the Academy of Sciences in 1890.

LOCUS DELICTI, a phrase used in criminal law to denote the place where a crime was committed.

LOCUST, ROCKY MOUNTAIN (*Caloptenus Spretus*). See *Britannica*, Vol. XIV, p. 767, and INSECTS, INJURIOUS, etc., in these Revisions and Additions. Commonly known as the "western grasshopper," the most destructive of all the migratory insects in the United States. From 1873 to 1876, enormous swarms of grasshoppers swept over all the settled parts of the Mississippi and Missouri valleys west of the 94th meridian. The damage done in 1874 alone was estimated at 50 millions of dollars. In 1876 many thousands of families in Kansas, Colorado, and Nebraska were so impoverished, by the devouring armies of grasshoppers that appeals for help in the shape of food and clothing had to be made to the whole country. Since 1876 there has been no general invasion. Among the remedies proposed we mention the following: Harrowing in fall will break up the eggs; burning the grass late in spring will kill the unfledged locusts, so will the rolling of the ground and the crushing of the clods. Trapping them in coal-oil pans driven over the land will kill them by contact with kerosene; and the insectivorous birds, which should be protected by law, will destroy thousands of them.

LOGAN, a post-village, a railroad center and the county-seat of Hocking county, Ohio, on the Hocking canal, fifty-one miles from Columbus. It has flour-mills, woolen and furniture factories, a foundry, and a furnace. Population, 3,119.

LOGAN, a post-town, the county-seat of Cache county, Utah, situated on the Utah Northern Railroad, ninety-seven miles north of Salt Lake City. It is the center of a fine wheat, stock, and dairy region, and has a number of manufactories and excellent water-power. Population in 1890, 4,624.

LOGAN, JAMES (1674-1751), an American statesman. He lived in Ireland and then in England till 1699, when he came to this country as William Penn's secretary. Soon afterwards he became provincial secretary, commissioner of property, and receiver-general of Philadelphia, and from 1702 to 1747 was a member of the provincial council. In 1815 he was made a justice of the court of common pleas, and in 1723 presiding judge. The same year he became mayor of Philadelphia, and from 1731 to 1739 was chief-justice of the supreme court. His latter years, spent in retirement, were devoted to science and literature.

LOGAN, JOHN ALEXANDER (1826-1886), an American soldier and statesman. At the beginning of

the Mexican war, though but twenty years of age, he at once enlisted and became a lieutenant in an Illinois regiment. He returned home with an excellent military record, and commenced the study of law. In 1849 he became clerk of Jackson county, and at the expiration of his term went to Louisville, Ky., where he was admitted to the bar in 1851. In the fall of the same year he was elected to represent Jackson and Franklin counties in the legislature, and from that time was almost uninterruptedly in the public service, either civil or military. He was twice reelected to the legislature, and in 1854 was a Democratic presidential elector. On the outbreak of the civil war he enlisted in the Union army, and rose to the rank of major-general. From 1871 to his death he was a United States Senator from Illinois, and in 1884 was nominated for the Vice-Presidency on the ticket headed by J. G. Blaine. Gen. Logan wrote *The Great Conspiracy* (1886); and *The Volunteer Soldier of America*, published in 1887, after his death.

LOGAN, SIR WILLIAM EDMOND (1798-1875), a Canadian geologist. In 1818 he entered the mercantile office of his uncle, Hart Logan, of London, and later was made a member of the firm. From 1831 to 1838 he was manager of the copper-smelting and coal mining operations in Swansea, South Wales. In 1842 he became head of the geological survey of Canada, and represented that country in the great exhibition at London in 1851, and in 1855 at Paris. He wrote many valuable articles and reports, and was the first to demonstrate that the stratum of clay that underlies coal-beds was the soil in which the coal vegetation grew.

LOGANIACEÆ, a natural order of corollifloral exogens, consisting of trees, shrubs, and herbaceous plants with opposite entire leaves, usually with stipules, which adhere to the footstalks or form sheaths. A few species of this order occur in Australia and in the temperate parts of North America; the rest are tropical or sub-tropical. No natural order of plants is more strongly characterized by poisonous properties. It includes the genus *Strychnos* which furnishes the Curari poison.

LOGANSFORD, a city, the county-seat of Cass county, Ind., situated at the confluence of the Eel River and the Wabash. Three lines of railways cross at this point. The city has a normal school, a State asylum for the insane, a public park, water, gas, and electric light works. It carries on the manufacture of flour, lumber, castings, etc., and is the seat of extensive railroad shops. Its trade with the surrounding country is considerable. Population in 1890, 13,798. See *Britannica*, Vol. XIV, p. 772.

LOGGIA, an Italian word signifying an open arcade, inclosing a passage or open apartment. It is a favorite class of building in Italy and other warm countries. The Loggia dei Lanzi at Florence, begun by Orcagna, in 1376, is one of the finest examples. See *Britannica*, Vol. XVII, p. 815.

LONDON PRIDE (*Saxifraga umbrosa*), a British plant, which, being unaffected by smoke, grows well in cities. It is a perennial evergreen, bearing small pink flowers. Also called St. Patrick's cabbage and none-so-pretty.

LONDON, a post-village, the county-seat of Madison county, Ohio, situated twenty-five miles west of Columbus. It is noted for its monthly stock sales. Population, 3,292.

LONDON CONFERENCES. The first diplomatic meeting so designated was held in 1826 for the regulation of the affairs of Greece; the next one was held in 1830 and the following years to arrange terms of agreement or of separation between Belgium and Holland. As the terms of agreement proposed were not accepted by the disputants,

Holland made an appeal to arms; but the capture of Antwerp by the French, and the blockade of their coast by the English and French fleets, brought the Dutch to agree to a treaty of definitive separation, May 21, 1833. A third conference was held in 1840, on the Turko-Egyptian question, in which France refused to take part. In 1852 a protocol was signed in London, by the representatives of all the great powers, declaring the indivisibility of the Danish monarchy (inclusive of Slesvig and Holstein).

LONG, STEPHEN HARRIMAN (1784-1864), an American engineer. In 1814 he entered the United States army as a lieutenant in the Corps of Engineers; was assistant professor of mathematics at the United States Military Academy till 1816; was transferred to the topographical engineers; from 1818 to 1823 had charge of explorations between the Mississippi River and the Rocky Mountains; and in 1823-24 of the sources of the Mississippi, receiving the brevet of lieutenant-colonel. From 1827 to 1838 he was engaged in railroad engineering, and then became major of topographical engineers. In 1861 he was made chief with the rank of colonel, and in 1863 he was retired from active service.

LONGAN (*Nephelium Longan*), a fruit of the same genus as the Japanese Litchi, but reckoned superior to it.

LONGFELLOW, SAMUEL, an American clergyman, brother of Henry Wadsworth Longfellow, born in 1819. In 1846 he graduated at the Harvard divinity school, and in 1848 was called to a church at Fall River. In 1853 he became pastor of a Unitarian church in Brooklyn, N. Y., but resigned in 1860, continuing to preach without pastoral charge until 1878 when he became minister of a church in Germantown, Pa. He has published, among other works, *A Book of Hymns and Tunes* (1859); and *Life of Henry Wadsworth Longfellow* (1886).

LONGIPENNES (Lat. *longus*, long, and *penna*, wing), a group of long-winged natatorial birds, including the gulls, terns, albatrosses and petrels.

LONGIROSTRES, a tribe of birds of the order *Grallæ*, having generally a long, slender bill, and inhabiting sea-shores and marshy places, where they seek worms and other food. To this tribe belong snipes, woodcocks, curlews, godwits, sandpipers, etc.

LONG ISLAND CITY, the county-seat of Queen's county, N. Y., on the East River, opposite New York City. It includes the former villages of Hunter's Point, Astoria, Ravenswood, Dutch Kills, and Blissville, which were united in 1870. From Brooklyn it is separated by Newtown Creek. Hunter's Point is the southwestern portion. It is the terminus of the Long Island Railroad and of the Flushing and North Side Railroad. It has large oil refineries, sulphuric acid factories, and many other large manufacturing establishments. Blissville, on Newtown Creek, is the seat of large distilleries, and of factories for compressed yeast, fertilizers, etc. Astoria, the northwestern portion of Long Island City, contains carpet and piano factories, and many good residences. The part of the city called Ravenswood contains also many handsome residences. Long Island City has an extensive front along the East River, Newtown Creek, and Long Island Sound, Newtown Creek being here also navigable. Population of the city, 30,396. See *Britannica*, Vol. XIV, p. 886.

LONGMONT, a post-village of Boulder county, Col., situated thirty miles north of Denver, on St. Vrain Creek.

LONGSTREET, AUGUSTUS B. (1790-1870), an American author. In 1815, he was admitted to the

Georgia bar; in 1821 he was a member of the legislature, and in 1822 became judge of the Ocmulgee judicial district. In 1838 he became a minister in the Methodist Episcopal church, and was stationed at Augusta. From 1839 to 1848 he was president of Emory College, Oxford, Ga.; then became president of Centenary College, La.; then for six years of the University of Mississippi; from 1857 to 1861 of South Carolina College; and then again of the University of Mississippi. He contributed extensively to periodical literature, and was the author of *Georgia Scenes, Characters, Incidents, etc., in the First Half Century of the Republic*, by a Native Georgian (1840); and *Master William Mitten* (1864).

LONGSTREET, JAMES, an American soldier, born in 1821. In 1842 he graduated at the United States Military Academy, and then served on frontier duty till the beginning of the Mexican war. He was then engaged in the battles of Palo Alto, Resaca de la Palma, Monterey, the siege of Vera Cruz, Cerro Gordo, San Antonio, Churubusco, and Moleno del Ray, and was brevetted captain and major. He then served on frontier and garrison duty till 1858, when he became paymaster. In 1861 he resigned and was commissioned brigadier-general in the Confederate army. He took part in several important battles of the civil war, among them being the first and second battles of Bull Run, the seven days' battle around Richmond, the battle of Fredericksburg, of Gettysburg, of Chickamauga, and the battle of the Wilderness. After the war Gen. Longstreet settled in New Orleans, and was appointed surveyor of customs by Grant, supervisor of internal revenue in Louisiana, postmaster of New Orleans, and United States minister to Turkey by Hayes, and United States marshal of Georgia by Garfield.

LONGTON, a municipal borough of Staffordshire, England, situated two and a half miles from Stoke-upon-Trent. The prosperity of the town is due to the manufacture of china and earthenware, though malting, brewing, and brick-making are carried on. Close by are iron works and collieries. Population, 18,620.

LONGVIEW, a post-village, a railroad junction and the county-seat of Gregg county, Texas, on Sabine River. There is an abundance of lumber in the vicinity and forty saw-mills are employed in its manufacture. Longview is a shipping point for lumber and cotton.

LÖNNROT, ELIAS, a Finnish philologist, born at Sammat, near Helsingfors, in 1802, died in 1884. After obtaining the degree of M. D. at the University of Helsingfors in 1832 and practising as a physician at Kajana, he was in 1853 made professor of the Finnish language and literature at the University of Helsingfors, he having for years collected Finnish songs, proverbs, and tales, and studied the Finnish language thoroughly. His master work is the *Kalevala* (See Britannica, Vol IX, p. 220), a national epic, imitated by Longfellow in his *Hjälwatha*. It is the "Iliad" of the Finns, as Dr. Lönnrot is the Finnish "Homer." The *Kalevala* is concerned entirely with the mythology or folk-lore of the Finnish people before their conversion to Christianity. The lyric poems which Dr. Lönnrot collected were published under the name of *Kanteletar*, because they were sung to a five-stringed harp, called *Kantele*.

LOOF, the after-part of a ship's bow or that portion where the planks incurvate towards the cutwater; the luff.

LOOMIS, ELIAS (1811-1889), an American physicist. From 1833 to 1836 he was a tutor at Yale College, and from 1837 to 1844 was professor of mathematics and natural philosophy in Western Reserve

College, Ohio. He then became professor of natural philosophy in the University of the City of New York, holding the office till 1860, when he accepted a call to the chair of natural philosophy and astronomy in Yale. He made numerous important discoveries in astronomy and published *Plane and Spherical Trigonometry* (1848); *Progress of Astronomy* (1850); *Analytical Geometry and Calculus* (1851); *Elements of Algebra* (1851); *Elements of Geometry and Conic Sections* (1851); *Tables of Logarithms* (1855); *Natural Philosophy* (1858); *Practical Astronomy* (1855); *Elements of Arithmetic* (1863); *Treatise on Meteorology* (1868); *Elements of Astronomy* (1869); and *The Descendants of Joseph Loomis* (1870).

LOPEZ, NARCISO (1799-1851), a Spanish American soldier. At the beginning of the war for the independence of Venezuela he took the popular side, but soon afterward entered the Spanish army and at the close had gained the rank of colonel. He then went to Spain, and served in the first Carlist war. In 1839 he was made major-general, and was appointed governor of Valencia. In 1843 he retired to private life in Cuba and in 1843 joined the revolutionary party. On account of the discovery of a conspiracy against the government in which he was interested, Lopez fled the following year to New York. He afterwards led three filibustering expeditions from the United States to Cuba, but was captured and executed by the garrote.

LOQUAT (*Photinia Japonica*), an esteemed Chinese and Japanese fruit, now abundant in Australia, of the natural order *Rosaceæ*, sub-order *Roseæ*, and of a genus closely allied to *Mespilus* (Medlar). The tree which produces it attains a height of 20 to 30 feet. It is a beautiful evergreen, with large oblong, wrinkled leaves, and white flowers in terminal woolly panicles, having a fragrance like that of hawthorn blossoms; the fruit is downy, oval, yellow, and about the size of a large gooseberry. The seeds have an agreeable flavor.

LORAIN, a post-village and railroad junction of Lorain county, Ohio, twenty-six miles west of Cleveland. It has car-shops, churches, a graded school and planing mills.

LORD-LIEUTENANT OF IRELAND, the viceroy or deputy of the sovereign to whom the government of Ireland is nominally committed. The office has existed from a remote period, the appointment having been made under different designations. The lord-lieutenant is appointed under the great seal of the United Kingdom, and bears the sword of state as the symbol of his viceregal office. In recent years the position of the lord-lieutenant has become little more than an "ornamental" one; and the abolition of the office is contemplated.

LORELEI, a cliff on the right bank of the Rhine, near St. Goar. It rises perpendicularly to a height of 427 feet, and is penetrated by a railway tunnel. Here is a famous echo. The name is best known from Heine's song, founded upon the tradition that a cave in the rock is the abode of the Lorelei, a wicked siren, whose beauty and sweet song attract hither boatmen, who are so enchanted by her that they are drawn into the whirlpool at the foot of the rock and so perish.

LORIMER (from Latin *lorum*, "a thong") a maker of bits, spurs, and generally all articles of horse-furniture. In London the lorimers, who had previously formed part of another guild, were incorporated by letters-patent in 1712.

LORING, WILLIAM WING (1818-1886), an American soldier. At thirteen he enlisted in a company of volunteers to fight the Seminole Indians of Florida, and gained a second lieutenancy. In 1842 he was admitted to the bar, and shortly afterwards was chosen to the Florida legislature. At the begin-

ning of the Mexican war he was made captain in a regiment of mounted riflemen, and at the close had become a lieutenant-colonel. Some time afterward he was ordered to Texas, where he remained till 1856, acquiring the rank of colonel, and then was engaged against hostile Indians in New Mexico. In 1861 he resigned his commission and entered the Confederate army as a brigadier-general. He fought with distinction in several important battles, and attained the rank of major-general. In 1869 he accepted the post of liwa pacha in the army of the Khedive of Egypt, and in 1876 was promoted to ferik, or general of division, and decorated by the Khedive with the imperial order of the Osmariah. He returned to the United States in 1879. Gen. Loring published *A Confederate Soldier in Egypt* (1883).

LORNE, JOHN GEORGE EDWARD HENRY DOUGLAS SUTHERLAND CAMPBELL, MARQUIS OF, a governor-general of Canada, born in London in 1845. In 1866 he became captain of the London Scottish volunteers, and two years later was promoted lieutenant-colonel of the Argyle and Bute volunteer artillery brigade, about the same time being chosen a member of parliament. In 1871 he married Princess Louise Caroline Alberta, sixth child of Queen Victoria, and in 1878 was appointed governor-general of Canada. His term of office expired in 1883. The Marquis of Lorne is the author of *A Trip to the Tropics and Home Through America* (1867); *Guido and Lita—a Tale of the Riviera* (1875); and *The Psalms Literally Rendered in Verse* (1877).

LOS ANGELES, a city of California, the chief town and business center of the southern part of the State. It was incorporated as a city in 1850. It is noted for its orange groves and vineyards, and is now a favorite winter resort for Eastern tourists. The climate is delightful. Los Angeles is on the Southern Pacific Railroad and at the junction of four branch railroads. It is the seat of the Branch Normal School of the State, and of the Medical School of the University of Southern California. The city has a large trade in oranges, wines, raisins, and other southern fruits. Its leading manufacture is that of large water pipes for irrigation works. Population in 1890, 50,394. See *Britannica*, Vol. XV, p. 7.

LOSSING, BENSON JOHN (1813-1891), an American author. For a time he was a watchmaker in Poughkeepsie, and then became a proprietor and editor of the Poughkeepsie "Telegraph." In 1836 he began the publication called the "Poughkeepsie Casket," and later became a wood engraver in New York City. He afterwards contributed to numerous illustrated magazines. Among his works are *Outline History of the Fine Arts* (1841); *Lives of the Presidents of the United States* (1847); *Seventeen Hundred and Seventy-six, or the War for Independence* (1847); *Life of Gen. Zachary Taylor* (1847); *Life of Gen. Winfield Scott* (1847); *The New World* (1847); *Lives of the Signers of the Declaration of Independence* (1848); *Pictorial Field-Book of the Revolution* (1852); *History of the United States for Schools* (1854); *Biographies of Eminent Americans* (1855); *Mount Vernon and Its Associations* (1859); *Life of Washington* (1860); *Pictorial Description of Ohio* (1869); *Our Country* (1873); *Story of the United States Navy for Boys* (1880); *Cyclopædia of United States History* (1881); *History of New York City* (1884); *Two Spies: Nathan Hale and John Andre* (1886); and *The Empire State* (1887).

LOST PROPERTY: in law the finder of lost property is entitled to keep it until the owner is found; but there are circumstances in which the keeping of it will amount to larceny. The rule which seems to be laid down in recent cases is that

if the finder of the property knows the owner, or has ready means of discovering him, then taking the property with the intention of keeping it amounts to larceny. On the other hand, if there be no reasonable probability of ever discovering the true owner there is no larceny. It has also been decided that the keeping of a lost article in hopes of getting a reward for giving it up, though the owner be known, does not amount to larceny. There is no obligation on the finder of lost property to incur expense in finding the owner, though the real owner can demand it from the one in whose possession it is.

LOT, one of the largest tributaries of the Garonne in France. It rises in a section of the Cevennes, flows in a western direction, at first as the Olt, and joins the Garonne at Aiguillon, after a course of nearly three hundred miles, almost two-thirds of which is navigable.

LOTIONS, or WASHES, remedies, usually dilute, applied for various conditions to circumscribed and different portions of the body. The most important groups are antiseptic, sedative and stimulating.

LOTOPHAGI (Gr. "*lotus-eaters*"), a name applied to a peaceful and hospitable people inhabiting a district of Cyrenaica, on the north coast of Africa, and much depending for their subsistence on the fruit of the lotus tree. According to Homer they received Ulysses hospitably when in the course of his wanderings he visited them with his companions, on whom, however, the sweetness of the lotus-fruit had such an influence that they forgot their native country and had no desire to return home.

LOTTERIES. By law of Congress it is forbidden to use the United States mail for the purpose of forwarding lottery tickets and circulating advertisements of lotteries. In twenty-nine States of our Union the constitutions forbid lotteries, and the statute laws of all the States, including Louisiana, are against these schemes. Yet lotteries exist in our large cities, are carried on clandestinely, are a continuous temptation to the weak, and are very demoralizing in their effect. The New York Society for the Suppression of Vice has for the past five years done all in its power to bring the so-called "policy-shops" to light and to suppress them. See *Britannica*, Vol. XV, p. 11.

LOTUS, a genus of leguminous plants similar to the clovers. The most common species, *Lotus corniculatus*, is known in Great Britain as birds-foot trefoil, and is a valuable addition to pasture grasses. The lotus of Barbary, described by Homer in *Odys.* IX, 84, and Herodotus, IV, 177, when they speak of the *Lotophagi* (lotus-eaters), is a prickly shrub, the jubube tree (*Zizyphus lotus*) whose fruit tastes sweet, like dates. It still grows in abundance and is much used as food. The sailors of Ulysses are said to have lost all desire of returning home after eating this fruit. The white and blue water lilies of the Nile, *Nymphaea cœrulea* and *N. lotus* have also been given the name lotus. They were worshipped by the ancient Egyptians. The "lotus flower" of India is *Nelumbium speciosum*, another sacred water lily, growing in Egypt, China and India. Its seeds and roots are eaten. A closely similar American species, *N. luteum*, known as the "water chinquapin," has been called lotus by American writers.

LOUDON, JOHN CLAUDIUS, a Scotch writer and horticulturist, born at Cambuslang, near Glasgow, in 1783, died at London in 1843. He went in 1803 to London, where he became a landscape-gardener. In 1819 he began to publish his encyclopædias. The first one was *Encyclopædia of Gardening* (1822); then

came the *Encyclopædia of Agriculture*; the *Encyclopædia of Plants*; the *Encyclopædia of Cottage, Garden, and Villa Architecture* (1832). His *Arboretum et Fruticetum* (1838), being an account of all the trees and shrubs of Great Britain was too costly for him to publish. In his later years he lost the use of his hands, but he continued to conduct several magazines on landscape-gardening.

LOUDONVILLE, a post-village of Ashland county, Ohio, on the Black Fork of the Mohican River, and on a railroad. It has a school, churches, tannery, mills, carriage-shops, and a foundry.

LOUISBURG, a small village on the southeast coast of Cape Breton Island, in Nova Scotia. Its excellent harbor induced the French, who originally inhabited the place, to build a very strong fortress here, at an expense of thirty million francs. During the war between France and England, which broke out in 1744, the New England colonists attacked this place, as it menaced their fisheries by sheltering French privateers. The New Englanders, 4,000 strong, besieged Louisburg, and the garrison, 1,600 strong, had to surrender, June 28, 1745. By the peace of Aix-la-Chapelle, in 1748, the town was again restored to France.

In 1758 a British general, Wolfe, the subsequent hero of Quebec, besieged Louisburg, and compelled the French garrison to surrender as prisoners of war. The town was then made a heap of ruins. In 1763 the British government destroyed every vestige of the fortress. Since that time only a few hundred fishermen have lived at Louisburg, and the place remains in the hands of Great Britain.

LOUIS D'OR, a French gold coin which was introduced in 1640, and continued to be coined till 1795. It ranged in value from about \$4 to \$4.60. The name has been occasionally applied to the French napoleon or 20-franc piece, and to certain German five-thaler pieces.

LOUISIANA, a city and railroad center of Pike county, Mo., on the Mississippi River. It has a college, gasworks, tobacco factories, and the surrounding region produces lumber and fruit. Population, 5,071.

LOUISIANA PURCHASE. Napoleon Bonaparte in 1800 (See LOUISIANA, STATE OF, in these Revisions and Additions) compelled Spain to cede her Louisiana territory back to France, and immediately made preparations to send an army to take possession. But this purpose was resisted by the protest of the United States, which had previously acquired possession of the adjoining territory on the east. France, being then threatened with war at home, yielded to this protest, and consented to sell the vast territory west of the Mississippi to the United States. The purchase was finally effected April 30, 1803, the agents on the part of the United States being Robert R. Livingston and James Monroe. The sum paid was \$11,250,000. On the same day, in another convention, it was agreed that the United States should assume to pay certain debts claimed to be due from France to American citizens; but the amount so claimed was not to exceed the sum of \$3,750,000. These claims have become historic under the designation of "French Spoliation Claims."

LOUISIANA, STATE OF. For general article on the STATE OF LOUISIANA see *Britannica*, Vol. XV, p. 22. The area of the State as recorded in the census report of 1890, is 45,420 square miles; population 1,118,587. Capital, Baton Rouge, with a population of 10,397. The population of New Orleans, the chief city and until 1880 the capital of the State, in 1890 was 241,995. The areas and populations of the several counties were as follows:

Counties.	Area.	Population.	
		1890.	1880.
Acadia.....	630	13,231	.....
Ascension.....	324	19,545	16,395
Assumption.....	335	19,629	17,010
Avozelles.....	353	25,112	16,747
Bienville.....	855	14,108	10,442
Bossier.....	780	20,330	16,042
Caddo.....	825	31,555	26,296
Calcasieu.....	3,410	20,176	12,484
Caldwell.....	548	5,814	5,707
Cameron.....	1,552	2,828	2,416
Catahoula.....	1,380	12,002	10,277
Cibola.....	800	23,312	18,837
Concordia.....	630	14,871	14,914
De Soto.....	865	19,850	15,603
East Baton Rouge.....	450	28,922	19,956
East Carroll.....	400	12,362	12,134
East Feliciana.....	485	17,903	15,193
Franklin.....	699	.....	9,489
Grant.....	648	8,270	6,188
.....	580	20,997	16,676
Iberville.....	650	21,848	17,544
Jackson.....	580	7,453	5,328
Jefferson.....	390	18,221	12,166
Lafayette.....	264	15,966	13,285
Lafourche.....	1,020	22,095	19,113
Lincoln.....	485	14,753	11,075
Livingston.....	620	5,769	5,258
Madison.....	664	14,135	13,906
Morehouse.....	845	16,786	14,206
Natchitoches.....	1,285	26,836	19,707
Orleans.....	187	242,089	216,090
Ouachita.....	644	17,985	14,685
Plaquemines.....	930	12,541	11,575
Point Coupee.....	580	19,613	17,785
Rapides.....	1,495	27,042	23,563
Red River.....	386	11,318	8,573
Richland.....	575	10,230	8,440
Sabine.....	1,010	9,390	7,344
Saint Bernard.....	680	4,326	4,405
Saint Charles.....	288	7,737	7,161
Saint Helena.....	420	8,062	7,504
Saint James.....	800	15,715	14,714
Saint John the Baptist.....	195	11,259	9,686
Saint Landry.....	1,700	40,250	40,004
Saint Martin.....	620	14,884	12,663
Saint Mary.....	640	22,416	19,891
Saint Tammany.....	915	10,160	6,887
Tangipahoa.....	780	12,355	9,638
Tensas.....	610	16,647	17,315
Terre Bonne.....	1,800	20,167	17,957
Union.....	905	17,304	18,596
Vermilion.....	1,230	14,234	8,728
Vernon.....	1,540	5,908	5,160
Washington.....	669	6,700	5,170
Webster.....	609	12,466	10,006
West Baton Rouge.....	210	8,363	7,667
West Carroll.....	380	3,748	2,776
West Feliciana.....	365	15,062	12,809
Winn.....	960	7,082	5,846

Population of the State by decades: 1810, 76,556; 1820, 152,953; 1830, 215,730; 1840, 352,411; 1850, 517,762; 1860, 708,002; 1870, 726,915; 1880, 939,946; 1890, 1,118,587.

Louisiana was visited in 1682 by La Salle, a Frenchman, who left the French settlement in Canada, and navigated the Mississippi from the mouth of the Illinois River to the Gulf of Mexico. In 1684 he endeavored to guide a colony from Rochelle, France, to Louisiana, but failed. The first successful attempt at settlement was made by the French under Iberville in 1700; the site selected was about 38 miles below the present city of New Orleans, and was named "Poverty Point." In 1762 the province was transferred by treaty to Spain. In 1763, under treaty between France and Spain on one side and Great Britain and Portugal on the other

side, "all that portion of Louisiana lying east of the Mississippi River from its sources to the river Iberville, and thence along the middle of the Iberville and the lakes Maurepas and Pontchartrain to the sea" was ceded to Great Britain. The province was governed by Spain until the year 1800. By the treaty of 1783 (at the close of the Revolutionary war) Great Britain had placed her territory in the United States, including her interests in the Mississippi Valley, in the possession of the United States. In 1800 Spain ceded her Louisiana territory back to France and in 1803 it was sold to the United States by Napoleon Bonaparte for the sum of \$11,250,000, with a stipulation that the United States should assume the claims of its citizens (French Spoiliations claims) against the French government. In 1804 nearly all the present area of Louisiana was organized into a territory under the name of Orleans. In 1810 some addition was made to the southeastern part (east of the Mississippi River), and in 1812 the whole was admitted into the Union as a State. The State was named in honor of Louis XIV. of France. The full list of governors is as follows:

TERRITORY OF ORLEANS.

William C. C. Claiborne, 1804-12.

STATE.

Wm. C. C. Claiborne.....	1812-16	Paul O. Hebert.....	1854-56
Jacques Viller.....	1816-20	R. C. Wickliffe.....	1856-60
Thos. B. Robertson.....	1820-22	Thos. O. Moore.....	1860-62
H. S. Thibodeaux.....	1822-24	George F. Shepley.....	1862-64
Henry Johnson.....	1824-28	Michael Hahn.....	1864-65
Peter Derbigny.....	1828-29	James W. Wells.....	1865-67
A. Baurvais.....	1829-30	Benj. F. Flanders.....	1867-68
Jacques Dupre.....	1830	Joshua Baker.....	1868
André B. Roman.....	1830-34	Henry C. Warmouth.....	1868-72
Edward D. White.....	1834-38	Wm. Pitt Kellogg.....	1872-76
André B. Roman.....	1838-41	Francis T. Nicholls.....	1876-80
Alexander Mouton.....	1841-45	Louis A. Wiltz.....	1880-82
Isaac Johnson.....	1845-50	Samuel McEnery.....	1882-83
Joseph Walker.....	1850-54	Francis T. Nicholls.....	1883-92*

*The term of office is four years; the present term expires in May, 1892.

For numerous items of interest relating to the State of Louisiana, see the article UNITED STATES in these Revisions and Additions.

LOUISVILLE, the largest city of Kentucky. The falls of the Ohio are at this point and a canal has been constructed for the use of steamboats which cannot pass over the rapids during low water. On the opposite side of the Ohio River stands the city of Jeffersonville, Ind., to which a fine railroad bridge, nearly a mile long, extends from the upper part of Louisville. From its lower part, called Portland, another railroad bridge extends to New Albany, Ind., and steam ferry-boats ply to both of these Indiana towns.

Louisville has wide, regular streets and substantial buildings. In the fine residence streets many houses have lawns and shrubbery in front. Among the prominent public buildings are the city-hall, the custom-house, the county-court, the library, the Roman Catholic cathedral, the State asylum for the blind, several hospitals, orphanages, and convents, and some commodious theatres. Among the schools are a law school, three medical colleges, and a number of private academies, including the Kentucky Seminary for young ladies.

Louisville is a port of entry and the principal mart of trade for the lower part of the Ohio Valley. Numerous railway lines center at this point. The Louisville, Nashville & Great Southern Railway system is one of the most extensive in the United States, and several other trunk lines and branch roads contribute to the business of the city. Louisville's principle trade is in tobacco, grain, whiskey,

pork, flour and leather, but furniture, farm-implements, machinery, gas, and water-pipes, and cement, are also largely manufactured and shipped. Much of the coal required for generating steam-power comes from Pittsburgh, Pa., but there are rich coal beds quite handy, and as yet almost undeveloped. Louisville's population has greatly increased since the close of the civil war in 1865. Population, 161,005. See Britannica, Vol. XV, pp. 22-24.

LOVAGE (*Ligusticum*), a genus of plants of the natural order *Umbelliferae*, allied to *Angelica*; the fruit is elliptical. Common Lovage is a native of the south of Europe; it is sometimes cultivated in gardens and used as a salad plant. Its roots and seeds are aromatic, acrid and stimulant; and are used to cure flatulency and to induce perspiration.

LOVEJOY, ELIJAH PARISH (1802-1837), an American abolitionist. In 1827 he established a school in St. Louis, Mo., and in 1829 became editor of a political paper. In 1833 he was licensed to preach by the Presbyterian church, and then established a religious paper called the "Observer" in which he condemned slavery. Repeated threats of mob violence compelled him to remove his paper to Alton, Ill., and his press was there destroyed three times by mobs. At the fourth attack, he and his friends defended the office, and compelled the mob to withdraw, but when Lovejoy opened the door he was instantly pierced by five bullets.

LOVEJOY, OWEN (1811-1864), an American abolitionist, brother of the preceding. In 1838 he became pastor of the Congregational church at Princeton, Ill., and then held anti-slavery meetings in all parts of the State until 1854 when he was chosen a member of the legislature. In 1856 he was elected to Congress, and remained there until his death.

LOVELL, MANSFIELD (1822-1884), an American soldier. In 1842 he was appointed a lieutenant of artillery, and then served through the war with Mexico, attaining the brevet rank of captain. In 1854 he resigned, and in 1858 was appointed superintendent of street improvements in New York City, the same year becoming deputy street commissioner. In 1861 he was commissioned a brigadier-general in the Confederate army, and served through the war. He then retired to a rice-plantation near Savannah, Ga., but soon afterwards became an assistant engineer in removing the East River obstructions at Hellgate.

LOWE, SIR HUDSON, a British general, born at Galway, Ireland, in 1769, died in London, July 10, 1844. Entering the army in 1787, he served in various parts of the Mediterranean, aided in the conquest of the Ionian Islands and became their first governor, and was afterwards for some time attached to the Prussian army under Blücher. In the spring of 1816 he became governor of St. Helena, with the custody of Napoleon, who had landed there in the previous October. The strictness of Lowe's watch of his charge brought upon him bitter attacks from Napoleon's friends and admirers. He published a defence of his conduct in *Mémoires relatifs à la Captivité de Napoléon à Ste. Hélène* (2 vols. Paris, 1830). In 1825 Lowe was appointed commander of the forces in Ceylon.

LOWELL, a city, one of the county-seats of Middlesex county, Mass., finely situated on the Merrimac River, at its confluence with the Concord. It is on the Boston, Lowell & Concord Railroad, at the junction of branches to Salem, Lawrence, and Ayer. It is also on a branch of the Boston & Maine Railroad, and is the terminus of the Framingham & Lowell Railroad. The city lies on uneven and hilly ground, but its streets are well laid out, well paved and sewered. The Merrimac River

falls here some thirty feet, affording great water-power, which is utilized by means of locks and canals. Steam-power is also very extensively employed.

Lowell is widely known as one of the greatest manufacturing cities of this country; the cotton and woolen mills alone number nearly one hundred, and use over half a million spindles. Among other important manufactures are machinery, hardware, chemicals, paper, leather, carriages, and furniture. There are also extensive bleacheries and dyeing establishments. For the welfare of the numerous operatives good homes and boarding-houses have early been put up, good evening schools and free reading-rooms are maintained, lectures on technical and industrial topics are frequently given, and every other thing is attended to which may prevent strikes and labor troubles. Lowell was incorporated as a city in 1836. Population in 1890, 77,696. See *Britannica*, Vol. XV, p. 29.

LOWELL, a post-village of Kent county, Mich., situated at the confluence of the Grand and Flat rivers. It has manufactories of flour, axes, and furniture.

LOWELL, FRANCIS CABOT (1775-1817), an American merchant, son of John Lowell, the statesman. He was the first to introduce cotton-manufacture into the United States, and the factories at Waltham, Mass., were established by him. The city of Lowell was named in his honor.

LOWELL, JAMES RUSSELL, American poet and essayist, born at Cambridge, Mass., Feb. 22, 1819. In 1840 he was admitted to the Massachusetts bar, but shortly afterwards devoted himself to literature. In 1854 he became professor of modern languages at Harvard; from 1857 to 1862 was editor of the "Atlantic Monthly," and from 1863 to 1872 of the "North American Review." In 1879 he became United States minister to the court of St. James, where he remained till 1885. Among his works are *Class Poem* (1838); *A Year's Life* (1841); *Poems* (1844); *The Vision of Sir Launfal* (1845); *Conversations on Some of the Old Poets* (1845); *Poems* (1848); *The Biglow Papers* (1848); *A Fable for Critics* (1848); *Poems* (1849); *Life of Keats* (1854); *Poems* (1854); *Poetical Works* (1858); *Mason and Slidell, a Yankee Idyl* (1862); *Fireside Travels* (1864); *The President's Policy* (1864); *Ode recited at the Commemoration of the Living and Dead Soldiers of Harvard University* (1865); *The Biglow Papers* (1867); *Under the Willows and other Poems* (1869); *Among My Books* (1870); *The Courtin'* (1874); *Three Memorial Poems* (1876); *Among My Books* (1876); and *Democracy, and other Addresses* (1887). He died Aug. 12, 1891.

LOWELL, JOHN (1743-1802), an American statesman. In 1762 he was admitted to the Massachusetts bar, and in 1778 was a member of the legislature from Boston. In 1782-'3 he was a member of the continental congress, and in 1784 was one of the commission to decide boundary disputes between New York and Massachusetts. In 1789 he was made United States judge for his State, and in 1801 became chief justice of the first circuit, including Maine, New Hampshire, Massachusetts, and Rhode Island.

LOWELL, JOHN (1769-1840), an American political writer, son of the preceding. He was admitted to the practice of law at the Massachusetts bar, in 1789, but after practising with marked success till 1803 he devoted himself entirely to literature. Among his writings are *Peace Without Dishonor—War Without Hope; an Inquiry into the Subject of the "Chesapeake"* (1807); *Candid Comparison of the Washington and Jefferson Administrations* (1810); *Diplomatic Policy of Mr. Madison Unveiled* (1810);

Mr. Madison's War; A Dispassionate Inquiry Into the Reasons Alleged by Madison for Declaring an Offensive and Ruinous War Against Great Britain (1812); and *Are You a Christian or a Calvinist?* (1815).

LOWELL, JOHN, (1799-1836), an American philanthropist, son of Francis Cabot Lowell. From 1817 to 1831 he was engaged in commerce, and then spent the remainder of his life in travel in the United States, Europe, Asia Minor, Egypt, Arabia, and Hindustan. He bequeathed \$250,000 for the maintenance in Boston of courses of free lectures on religion, science, and art, and the Lowell institute since 1839 has continued its operations with marked success.

LOWELL, ROBERT TRAILL SPENCE, an American clergyman, grandson of John Lowell the statesman, and elder brother of James Russell Lowell, the poet, born in 1816. In 1839 he began the study of theology, and in 1842 was ordained a priest in the church of England. He then became bishop's chaplain in the Bermuda Islands, and later was rector at Bay Roberts, Newfoundland. In 1847, on account of failing health, he returned to the United States, and began a mission among the poorer people of Newark, N. J. From 1859 to 1869 he was rector of Christ church, Duanesburg, N. Y., and then for four years was head master at St. Mark's school, Southborough, Mass. From 1873 to 1880 he was Professor of the Latin language and literature in Union college. Among his publications are *The New Priest in Conception Bay* (1858); *Fresh Hearts that failed Three Thousand Years Ago, and other Poems* (1860); *Antony Brade, a Story of School-Boy Life* (1874); *Burgoyne's March* (1877); and *A Story or Two from a Dutch Town* (1878). He has also contributed extensively to periodical literature.

LOWRY, ROBERT, an American clergyman, born in 1826. He entered the Baptist ministry in 1856, and then had charges in New York City, and Brooklyn, N. Y., West Chester and Louisburg, Pa., and Plainfield, N. J. From 1880 to 1886 he was president of the Baptist Sunday-School union of New Jersey. Dr. Lowry has edited *Chapel Melodies* (1868); *Bright Jewels* (1869); *Pure Gold and Hymn Service* (1871); *Royal Diadem and Temple Anthems* (1873); *Tidal Wave* (1874); *Brightest and Best* (1875); *Welcome Tidings and Fountain of Song* (1877); *Chautauqua Carols* (1878); *Gospel Hymn and Tune-Book* (1879); *Good as Gold* (1880); *Our Glad Hosanna* (1882); *Joyful Lays* (1884); and *Glad Refrains* (1886).

LOWVILLE, a post-village, the county-seat of Lewis county, N. Y., one and a half miles west of the Black River, in a rich agricultural region producing cheese, butter, and also lumber. The village contains a noted academy founded in 1808, and also foundries and mills.

LOYSON, CHARLES, formerly known under the monastic name of Pere Hyacinthe, born at Orleans, France, March 10, 1827. He studied at St. Sulpice, and in 1851 was ordained priest, and taught philosophy and theology at Avignon and Nantes. Subsequently entering the order of Carmelites, he became known as a powerful preacher, attracting crowded and enthusiastic audiences of all ranks of society to the Madeline and Notre Dame in Paris. Almost as remarkable as his eloquence was the boldness with which he denounced existing abuses in the church; and in 1869 the general of his order imposed silence on him. Hyacinthe replied by a letter in which he called for a thorough reform of the church, and was excommunicated by the pope. He then became a secular priest, resuming his family name, Loyson. In 1869 he visited the United States, and on his return to France married an American lady. He was afterwards for a short time curé of a congregation of Liberal Catholics at

Geneva, Switzerland, and in 1879 he established an independent congregation in Paris under the name Église Gallicane. He has published a number of sermons and lectures.

LUBBOCK, SIR JOHN, baronet, an English statesman and naturalist, born at London in 1834. At the age of fourteen he entered his father's banking house and in 1856 he became a partner. In 1865 he succeeded to his father's title and business. In 1880 he was elected a member of parliament by the University of London, which he still (1891) represents, and has procured the passage of important public measures. Sir John made investigations of the ancient vestiges of the human race, and researches into the life of the lower animals which have become classical. He published: *Prehistoric Times* (1865); *The Origin of Civilization and the Primitive Condition of Man; Origin and Metamorphosis of Insects; On British Wild Flowers; Ants, Bees and Wasps* (1884); *The Senses, Instincts and Intelligence of Animals, With Special Reference to Insects*. His *Pleasures of Life* has attained its twentieth edition.

LÜBECK, a free city and state of the German Empire. For general article on this state (forming a republic and governed as such in all local affairs) see *Britannica*, Vols. XV, p. 31; XI, p. 450. The latest official reports (Dec. 1, 1885) give the area at 116 square miles, and the population at 67,658. In religion the Protestant population numbered 65,997 (97.5 per cent.) and the Roman Catholics, 805 (1.2 per cent.). The estimated revenue in 1890 amounted to 3,459,816 marks, and the expenditures to about the same amount. Of the revenue, about one-sixth is from public domains, chiefly forests; one-fourth from interest and the rest from taxation. One-fourth of the expenditures is for interest on and reduction of the public debt, which in 1889 was 13,847,667 marks. The imports by sea were valued at 81,228,000 marks; the exports at 109,861,000 marks.

LÜBKE, WILHELM, a German art historian, born at Dortmund in 1826. After studying at Bonn and Berlin, he soon attracted attention by his articles on the history of art published in the "Deutsche Kunstblatt." In 1855 he was made professor of the history of architecture in the Berlin school of architecture. Lübke made several journeys in Italy, France, and Belgium for the purpose of studying church architecture. In 1861 he became professor of archaeology and the history of art in the Polytechnic School at Zürich, and in 1866 he was called to a similar position at Stuttgart. His chief publications are: *Vorschule zur Geschichte der Kirchenbaukunst des Mittelalters; Geschichte der Architektur; Grundriss der Kunstgeschichte, and Geschichte der Plastik*.

LUCAN, GEORGE CHARLES BINGHAM, THIRD EARL OF, a British general, born April 16, 1800, died Nov. 10, 1888. He was educated at Westminster, and on leaving school entered the army. He accompanied the Russian troops under General Diebitsch as a volunteer against the Turks in 1828; succeeded to the title and large estates in Ireland in 1839; and as commander of a division of cavalry in the Crimea fought at the Alma, Balaklava, and Inkermann. Appointed lieutenant-general in 1858, and G. C. B. in 1869, he became field-marshal in 1887.

LUCARHE, a Dormer window, especially in a church spire. See *ARCHITECTURE*, *Britannica*, Vol. II, p. 467.

LUCINA ("the light-bringing"), a name applied to Diana and to Juno, the latter corresponding to the Iliithya of Greek mythology.

LUDEWIG, HERMANN ERNST (1809-56), a German American author. He was born in Dresden, Sax-

ony, and in 1844 emigrated to the United States. Among his published works are *Le Livre des Ana* (1837); *Zur Bibliothekökonomie* (1840); *Literature of American Local History* (1846); *Supplement Relating to Local History of New York* (1848); *De l'Histoire des Aborigènes du Mexique* (1854); and *Literature of American Aboriginal Linguistics* (1858).

LUDINGTON, a city, the county-seat of Mason county, Mich., on Lake Michigan, at the point where Père Marquette Lake and River enter the larger lake. It is the western terminus of the Flint and Père Marquette Railroad, and is connected with Milwaukee, Wis., eighty-four miles southwest, by a steamer line. It has a good harbor, manufactures shingles and carriages, and contains a foundry and machine-shop. Population, 7,499.

LUDLOW, a post-village in Windsor county, Vt., situated on Black River and on the Rutland division of the Vermont Central Railroad, twenty-five miles east of Rutland. It has an academy, a foundry, and manufactories of woolen goods, carriages, toys, and machinery.

LUDWIG, KARL FRIEDRICH WILHELM, a German physiologist, born at Witzenhausen, Hessen, in 1816. After studying medicine at Marburg and Erlangen, he was appointed professor of comparative anatomy at Marburg in 1846. From 1849 to 1855 he held the chair of physiology at Zürich. In 1855 he was called to Vienna, and in 1865 he became professor at Leipzig. His investigations in anatomical physiology place him in the front rank of that department of science. Ludwig's principal work is *Lehrbuch der Physiologie des Menschen* (1852-55); but his *Arbeiten aus der Physiologischen Anstalt zu Leipzig*, and his essays in scientific journals contain valuable contributions to physiology.

LUGGER, a vessel having two or three masts and a running bowsprit, upon which lug-sails and two or three jibs are set. The rig is not adapted to large vessels.

LUMBER. The lumbering industry of the United States has steadily moved westward. Fifty years ago Maine was the great lumbering region. The principal competition came from New York and Pennsylvania. In 1850 these two equalled Maine, and in 1860 they exceeded her. In the sixties Michigan and Wisconsin became prominent, and in the next decade they eclipsed Maine and New York. At present Chicago is the greatest lumber market of this country. But at the present rate of depletion of the western woods their available timber of commercial value will ere long disappear, and then Chicago will lose its position as the main center of the lumber industry. The army of the axe and the sawmill will then again have to take up its march westward and attack the forests of the Pacific slope and also march southward to the forests of the Gulf region. The original white pine forests of the Eastern and Middle States have long since disappeared and those of the West are now being rapidly destroyed, not only by the axeman, but also by fire. Millions of acres are annually swept away by forest fires, the area burned over in the year 1880 alone being no less than ten millions of acres. The sawmills and smelters use still larger quantities of timber, the smelters especially by converting it into charcoal for their furnaces.

White pine is the most easily worked lumber, on account of its softness and comparative freedom from knots. Nearly one-half of the white pine used in this country is now supplied by Michigan, Wisconsin, and Minnesota. When the lumber of this region gives out it must be replaced by the red-fir of the Cascade and Coast Ranges. The redwood is the only real substitute for white pine within the United States.

Regarding the supply of hard-wood lumber, the forests of the Mississippi basin are very important. They furnish at present most of the walnut, ash, cherry, and yellow poplar lumber. The southern Appalachian mountains, extending through Virginia, West Virginia, North and South Carolina, Kentucky and Tennessee, also supply a large quantity of oak, walnut, cherry, and yellow poplar lumber. These mountains contain an abundant store of hardwood timber. It is bound to gain importance when the white pine, now the most valuable of our lumber trees, loses its prominence, as it will in course of time, the annual consumption of white pine being, according to Prof. Sargent's calculation, not less than 10,000 millions of feet, while all the white pine timber ready for the axe in 1882 was calculated to be only 85,000 millions of feet. The yellow pine of the south is a hard, resinous wood, not suited to replace the white pine.

The use of lumber is on the increase. It is mostly employed in building houses, ships, bridges, and fences; for making furniture, agricultural and other implements, for boxes, trunks, cars, doors and blinds, wagon-beds, and innumerable other things.

The most highly valuable of our hard-wood trees is the black walnut. It is especially used in cabinet work and for the interior finish of houses. Other woods valued for similar purposes are the wild black cherry, the butternut, the mountain hazel, the white and the black ash, the chestnut, and the American holly. The sycamore is mainly used for tobacco-boxes, and the cedar for cigar-boxes.

In the census report for 1880 the capital invested in the lumber business of the United States is given as 181 millions of dollars; the number of hands employed as 147,956; the number of feet of lumber turned out yearly as 18,000 millions, and the total value of all the products of the lumber industry (including laths, shingles, staves, and bobbin stock) as 233 millions of dollars. In this production the State of Michigan stands foremost with 50 millions for sawed lumber alone; then comes Pennsylvania with 22 millions; Wisconsin with 18 millions; New York, Indiana and Ohio with 14 millions each; Maine and Minnesota with 8 millions each; Iowa with 6 millions; Missouri, Illinois and Georgia with 5 millions each; California, Kentucky and New Hampshire with 4 millions each; Tennessee, Texas and Virginia with 3½ millions each; Vermont, Massachusetts and Florida with 3 millions each; North Carolina, Alabama and West Virginia with 2½ millions each; South Carolina, Oregon, Mississippi, Maryland, Arkansas, Louisiana and Washington Territory with 2 millions each; New Jersey with 1½ millions, and Connecticut and Colorado with 1 million each. The other States and Territories produced less than one million dollars worth of sawed lumber each. The exportation of forest products, consisting of sawed and hewed timber, boards, shingles, etc., from this country during the year ending Sept. 30, 1885, amounted to the value of 21½ millions of dollars. The importations during the same year aggregated 8½ millions of dollars worth. These included woods, used for the finest cabinet finish, of species not grown in the United States, such as rose and satin-wood, mahogany, ebony, etc.

LUNAWARA, a small state of India, of the Rewacanta agency, in the province of Gujarat, having an area of 388 square miles, and a population of 75,450. The region is hilly and well wooded. The capital, from which the state derives its name, is 60 miles from Baroda, near the Mahi or Mhye River. Population, 9,059.

LUNDY, a granitic island of Devonshire, in the mouth of the Bristol Channel, 30 miles from St. Gowan's Head in Wales. It measures three and a half miles by one, has rocky and precipitous shores, with only one landing place on the south side; and attains an altitude of 525 feet. Here, near the southern end of the island, is a lighthouse, built in 1820. The antiquities include prehistoric kists, remains of round towers and a chapel, and the ruined castle of the Mariscoes, from whose time on into the 17th century Lundy was a stronghold successively for pirates, buccaneers, privateers and smugglers. Population in 1881, 177.

LUNDY, BENJAMIN (1789-1839), an American philanthropist. In 1815 he organized an anti-slavery association at St. Clairsville, Ohio, and in 1822 began the publication of the Mt. Pleasant "Genius of Universal Emancipation," a monthly. Afterwards he removed his paper to Baltimore, then to Washington, and finally to Philadelphia. Lundy was the first to establish anti-slavery periodicals and to deliver anti-slavery lectures, and probably the first to induce the formation of anti-slavery societies.

LUNEL, a town in the south of France, 14 miles northeast of Montpellier, with a trade in Muscatel wine and brandy. Interesting human remains have been found in a cave at Pondres, six miles north of Lunel. Population, 6,460.

LUNGWORT, or OAT-LUNGS (*Sticta pulmonaria*), a lichen with a foliaceous, leathery, spreading thallus, of an olive-green color, pale-brown when dry. It grows on trunks of trees in mountainous regions in European countries, sometimes almost covering them with its shaggy thallus. It is nutritive, and when properly prepared affords a light diet, yet it is bitter enough to be used as a substitute for hops. It yields a good brown dye. The name is also given to a genus of phanerogamous plants of the natural order *Borraginæ*. The common lungwort (*Pulmonaria officinalis*), of Europe, has ovate leaves and purple flowers. It is mucilaginous and slightly emollient, and contains niter in considerable abundance.

LUNT, GEORGE (1803-1885), an American author. In 1827 he began the practice of law in Newburyport, Mass., and soon afterwards became a member of the legislature. Under Gen. Zachary Taylor's administration he was United States district attorney, and just prior to the civil war edited the Boston "Courier." Much of his time was given up to literary pursuits, and he wrote *Poems* (1839); *The Age of Gold* (1843); *The Dove and the Eagle* (1851); *Lyric Poems* (1854); *Julia* (1855); *Eastford, or Household Sketches* (1855); *Three Eras of New England* (1857); *Radicalism in Religion, Philosophy and Social Life* (1858); *The Union, a Poem* (1860); *Origin of the Late War* (1866); *Old New England Traits* (1873), and *Miscellanies, Poems, etc.* (1884).

LUNT, WILLIAM PARSONS (1805-1857), an American clergyman. From 1828 to 1833 he was pastor of the Second Unitarian Church of New York, and from 1835 to his death was associate pastor of the Unitarian church in Quincy, Mass. He published *Discourse at the Interment of John Quincy Adams* (1846); *Union of the Human Race* (1850); *Sermon on Daniel Webster* (1852), and *Gleanings* (1874).

LUSTRUM, the solemn offering made for expiation and purification by one of the censors in the name of the Roman people at the conclusion of the census. As the ceremony was performed at the end of every five years, the word *lustrum* came to mean a period of five years.

LUTHARDT, CHRISTOPH ERNST, a German theologian, born in Bayaria in 1823. After studying theology at Munich he spent some years in teaching. In 1854 he became extraordinary professor of

theology at Marburg, and in 1856 he was made professor of theology and New Testament exegesis in the University of Leipzig. He belongs to the Lutheran school, which accepts the Augsburg confession. His principal works are *Das Johannesevangelium*; *Die Lehre von den letzten Dingen*; *Die Lehre vom freien Willen*; *Compendium der Dogmatik*; *Die Ethik Luther's*; *Der Johannesevangelium Ursprung des Vierten Evangeliums*, and *Apologie des Christenthums* (1864-80). He exerted great influence by these books and his periodical publications.

LUTTRINGHAUSEN, a town of Rhenish Prussia, five miles southeast of Elberfeld. It has manufactories of cloth, calico and silk, hardware and brandy. Population in 1885, 10,216.

LUVERNE, a village, the county-seat of Rock county, Minn., situated on Rock River, and on a branch of the Sioux City & St. Paul Railroad.

LUZULA, a genus of plants of the natural order *Juncaceæ*, having a three-seeded capsule and soft plane leaves, which are generally covered with thinly-scattered longish hairs. They grow in woods, pastures and elevated mountainous situations. The field-rush (*L. campestris*), a plant of a very humble growth, has flowering spikes congregated into a close head. The species which grow under the shade of trees preserve their verdure in winter.

LUZZATTO, SAMUEL DAVID, an eminent Jewish scholar, born at Trieste, in Istria, Aug. 22, 1800, died at Padua in 1865. When only 15 years old he published a volume of Hebrew verses. In 1829 he was appointed professor of Biblical literature in the rabbinical college of Padua. Among the Hebrews in Italy Luzzatto was celebrated for deep learning and wise judgment. He wrote against the Cabalists, published some volumes of Hebrew verse and several treatises and commentaries on Jewish theology. He was preparing a version of the Old Testament in Italian when he died. His son, PHLOXENE LUZZATTO (1829-1854), was distinguished as a linguist.

LYALL, EDNA, the pen-name of Miss Ada Ellen Bayly. She was born and educated at Brighton, England, and commenced her literary career at an early age. Her books have attained a widespread popularity. They include *Donovan*; *We Two*; *In the Golden Days*; *The Autobiography of a Slander*; *Der-rick Vaughan*; *Knight Errant*, and *A Hardy Norseman*.

LYCHNIS, a genus of plants of the natural order *Caryophyllaceæ*. They are herbaceous plants, generally perennial, and natives of temperate countries. The flowers of *L. Vespertina* are usually fragrant in the evening. The Scarlet Lychnis (*L. Chalcedonica*), a native of Asia Minor, is a brilliant ornament of flower-borders. Some of the species have saponaceous properties.

LYDIAN MODE, one of the ancient Greek authentic modes in music, which was retained as one of the old church modes. Since the Reformation the melodies of the Lydian mode have entirely disappeared, and it is used only occasionally in modulation from other modes.

LYGODIUM, a widely diffused genus of climbing ferns. Of the 16 known species only one, *L. palmatum*, the climbing fern or Hartford fern, is a native of the United States, being found from Massachusetts to the Gulf States. The leaf-stalk, resembling a twining stem, is from 1 to 3 feet long, with short alternate branches. It is much prized for purposes of decoration. A number of fossil species have been described.

LYKENS, a post-village of Dauphin county, Pa., 25 miles from Harrisburg. It is a coal-shipping point, and has foundries, saw and planing mills.

LYMAN, THEODORE, an American naturalist, born in 1833. In 1863 he entered the Union army

as aide-de-camp to General G. G. Mead, with the rank of lieutenant-colonel, and was present at many of the most important battles of the war. From 1865 to 1882, he was fish commissioner of Massachusetts, and since 1860, has been assistant at the museum of comparative zoölogy in Cambridge. He has published *Illustrated Catalogue of the Ophiuridæ and Astrophytidæ in the Museum of Comparative Zoölogy* (1865); *Supplement* (1871); *Report on Ophiuridæ and Astrophytidæ Dredged by Louis F. de Pourtales* (1869); *Old and New Ophiuridæ and Astrophytidæ* (1874); *Ophiuridæ and Astrophytidæ of the Hassler Expedition* (1875); *Dredging Operations of the United States Steamer "Blake"*; *Ophiurans* (1875); *Prodrome of the Ophiuridæ and Astrophytidæ of the "Challenger" Expedition* (1878), and *Report on the Ophiuridæ Dredged by H. M. S. "Challenger" During the Years 1873-6* (1881).

LYME GRASS (*Elymus*), a genus of grasses, whose species are natives of the temperate and colder regions of the northern hemisphere. The Sea Lyme Grass (*E. Arenarius*) is frequent on sandy shores in parts of Europe; it is a coarse, grayish perennial grass, with creeping roots very useful in binding the sand, and on this account it is much sown on the shores of Holland. In Iceland it is used for thatch, and the seed is ground into meal, which is made into porridge or into soft, thin cakes, and is esteemed a great delicacy. Several species of *Elymus* are known in the United States, as the *E. Virginicus*, *Canadensis*, *striatus*, and *mollis*. The first two are common near river-banks, the third in rocky woods, and the last on the shores of lakes Huron and Superior, and in Maine.

LYME REGIS, a seaport and watering place of Dorsetshire, at the mouth of the Lyme rivulet, five miles southeast of Axminster. The Cobb breakwater, dating from the 14th century, was reconstructed in 1825-26. Miss Mary Anning, the discoverer of the *Ichthyosaurus* and *Plesiosaurus* in the Lias rocks here, which are largely quarried, was a native of this place. Population in 1881, 2,048.

LYNCH, PATRICK NILSON (1817-1882), an American Roman Catholic bishop. In 1840 he became assistant pastor at the cathedral of Charleston, S. C., and from 1844 to 1855, was pastor of St. Mary's church, of that city. In 1858 he was consecrated bishop. His articles on the *Vatican Council*, and *The Blood of St. Januarius* were published in book form.

LYNCH, THOMAS (1749-1779), a signer of the Declaration of Independence. On the organization of the first regiment of South Carolina provincials in 1775 he was commissioned a captain, and in 1776 was elected to a seat in the continental Congress. On account of failing health he embarked in 1779 for the south of France, but the ship in which he sailed was seen for the last time when a few days out at sea.

LYNCBURG, a city of Virginia, in Campbell county, on the James River. Population in 1870, 6,825; in 1890, 19,779. See *Britannica*, Vol. XV, p. 105.

LYNN, a city of Essex county, Mass., located on the north side of Massachusetts Bay, near the foot of the Nahant Peninsula, about ten miles northeast of Boston, with which city it is connected by several railways. Lynn is noted for the manufacture of boots and shoes, mostly women's and children's shoes which are sent all over the United States. The Thomson-Houston electric factory is located here. It employs some fifteen hundred men and turns out machinery for many electric lighting and power plants. Population, 55,727. See *Britannica*, Vol. XV, p. 109.

LYNN, MARY (1797-1849), an American educator. From 1814 to 1837, the most of her time was devoted

to teaching in various schools, and in the latter year she founded Mount Holyoke seminary, at South Hadley, Mass. From that date to her death she served as its principal. She published *Tendencies of the Principles Embraced and the System Adopted in the Mount Holyoke Seminary* (1840), and *Missionary Offering* (1843).

LYON, NATHANIEL (1818-1861), an American soldier. He entered the United States army in 1841, and served in the Florida and Mexican wars, receiving the brevet of captain. He then served on frontier duty until the beginning of the civil war, when he was put in command of the arsenal at St. Louis, and broke up a camp of secessionists, whom he routed at Boonesville, June 17, 1861. On August 2, being then brigadier-general of volunteers, he defeated the Confederate forces at Dry Spring, Mo. He was killed while commanding in the battle of Wilson's Creek.

LYONNAIS, a former province of France, bounded on the west by Auvergne and on the south by Languedoc. Its territory coincides nearly with the present department of the Rhone, Loire, Haute-Loire, and Puy-de-Dôme.

LYONS, a city and railroad center of Clinton county, Ia., situated on the Mississippi River. It has extensive nurseries, several excellent schools, and manufactories of wrapping-paper, flour, oil-cans, and carriages. Population, 5,791.

LYONS, a city, the county-seat of Rice county, Kan., situated twenty-one miles east of Ellinwood.

LYONS, a post-village, the county-seat of Wayne county, N. Y., midway between Syracuse and Rochester, on the New York Central Railroad. It is a peppermint-oil market, and manufactures fanning-mills, and farm-implements. A musical academy is located here.

LYONS, RICHARD BICKERTON PEMELL (1817-1887), a British diplomatist. From 1857 to 1865, he was minister to the United States, from 1865 to 1867, ambassador to Turkey, and from 1867 to 1887, ambassador to France. In 1865 he became a member of the privy council, in 1881 was made a viscount, and in 1887 an earl.

LYSIMACHIA, a large genus of erect or creeping herbaceous perennial plants, belonging to the natural order *Primulaceae*. The entire leaves are opposite, alternate, or whorled; the flowers have a five or six parted corolla with the stamens affixed to the base, and are generally solitary in the axils or in racemes. The European *L. mummularia*, or moneywort, is an ornamental trailing vine with bright-yellow flowers, commonly cultivated in gardens. *L. quadrifolia*, the crosswort, is an ornamental American species.

LYTHRACEÆ, a natural order of exogenous plants, mostly herbs, and rarely shrubs or trees, chiefly natives of the tropics; a few are found in Europe and in North America. Loosetrife (*Lythrum Salicaria*), with an abundance of purple flowers, grows abundantly on the margins of ponds and streams in Britain. The Henna of Egypt is produced by *Lawsonia alba*, a plant of this order. The leaves of *Ammannia Vesicatoria*, an East India aquatic plant, are very acrid and are sometimes used as blisters. *Physocalymma Floribunda*, a Brazilian tree of this order, growing about 30 feet high, furnishes the valuable rosewood (the American tulipwood) of commerce.

LYTTON, EDWARD ROBERT BULWER-LYTTON, MARQUIS OF, an English poet, the only son of Lord Lytton, the novelist and dramatist, born 1831. After being educated at Harrow and Bonn, he entered (1849) the diplomatic service. In 1863 he was secretary of legation at Copenhagen, and the next year he served in the same capacity at Athens. He subsequently became *Chargés d'Affaires* at Lisbon, at Madrid, and at Vienna; and in 1872 he was appointed secretary of the embassy to Paris. While at Paris he inherited his father's estates and titles. Two years later he was sent as ambassador to Lisbon, and in 1876 was appointed viceroy of India. In 1887 he became ambassador to Paris. Lord Lytton published in 1855, *Clytemnestra and Other Poems Under the nom de plume of "Owen Meredith,"* he also wrote *Lucille; Tannhäuser; Orval; Fables in Song; Glenaveril*, and *Life and Letters* of his father (1883), in which he incorporated his father's autobiographical notes. He died at Paris Nov. 24, 1891.

M

MAB—MACOMB

MAB (Cymric, "a child"), an imaginary being celebrated by Shakespeare and other English poets. In English folk-lore she shares with Titania the honor of being queen of the fairies.

MACADAM, JOHN LUDLOW, a Scottish constructor of roads, born at Aye in 1756, died at Dumfriesshire in 1836. He lived at New York from 1770 to 1783, and was a loyalist during our Revolutionary war. After the war he returned home, and about 1810 became known as the inventor of "metalled" or "macadamized" roads. His system consisted in completely covering the road-bed with small broken stones without using a substratum of larger stones, as in Telford's more expensive system. The stones he used were from 1 to 6 ounces in weight. He wrote *Practical Essay on the Scientific Repair and Preservation of Public Roads*, and *Remarks on the Present State of Roadmaking*; also *Observations on Roads* (1822). See *Britannica*, Vol. XX, p. 582.

MACAPA, a town of Brazil, in the province of Para, on the left bank of the Amazon, three miles north of the equator. It has a good harbor, and considerable trade in timber and ornamental woods. Population about 7,500.

MACAW-TREE, GREAT (*Acrocomia sclerocarpa*), a palm of the same tribe as the cocoa-nut, a native of the West Indies and the warm parts of America. It is called *Macoya* in Guiana and *Macahuba* in Brazil. It is from 20 to 30 feet high, with pinnate leaves from 10 to 15 feet long. The fruit yields an oil of a yellow color, of the consistence of butter, with a sweetish taste and an odor of violets.

MACCALUBA, a remarkable mud volcano, 138 feet in height, situated six miles north of Girgenti in Sicily. The sides are studded with numerous small cones, which usually emit hydrogen and occasionally mud and stones, often sending them to a great height.

MAC CONNELLSVILLE, a post-village, the county-seat of Morgan county, Ohio, situated on the Muskingum River. It contains a woolen factory, a foundry, and a tobacco factory. There are extensive salt-works in the vicinity.

MACE, a heavy club about 5 feet long, surmounted by a metal head, frequently spiked, which was used as a weapon by knights and warlike churchmen in the Middle Ages. The ornamental maces borne as an ensign of authority, may be traced to the 12th and 13th centuries, when princes armed their guards with spikeless maces against the sudden attacks of the assassins. The need passed away, but the maces remained as symbols of rank. In the Congress of the United States the sergeant-at-arms has a silver mace.

MACHÆRODUS, a genus of fossil carnivorous mammals distinguished by extremely long upper canine teeth. See *Mammalia*, *Britannica*, Vol. XV, p. 435.

MACHIAS, the county-seat of Washington county, Me., on Machias River, at the head of navigation. It is a port of entry, and contains a custom-house, foundry, sash and blind factory, and many good schools. Lumbering and ship building are important industries.

MACKAY, CHARLES, a Scotch poet, born in Perth, in 1814, died in 1889. The publication of a small

volume of poems in 1834 led to his becoming assistant editor of the "Morning Chronicle." From 1844-47 he was editor of the "Glasgow Argus," he acted on the literary staff of the "Illustrated London News," and filled the post of New York correspondent of the London "Times," during the civil war. The "London Review," a weekly journal which he established in 1860, was not a success. Down to the time of his death, Dec. 24, 1889, he issued many volumes of poetry and prose, and was a contributor to "Blackwood's Magazine," the "Nineteenth Century," and other periodicals. Two of Mackay's songs, "There's a Good Time Coming," and "Cheer, Boys, Cheer," had an extraordinary vogue. Four hundred thousand of the first having been sold, without putting anything into his pocket. *Gossamer and Snowdrift*, his posthumous poem was published in 1890.

MACKENZIE RIVER, in North America, has its origin as the Athabasca in the Rocky Mountain Lake in British Columbia, flows over 600 miles to Lake Athabasca, and 240 as the Slave River to Great Slave Lake, conveying the waters of the Great Slave Lake to the Arctic Ocean at Mackenzie Bay, after a final course which is reckoned at 1,045 miles, making a total river system of nearly 2,000 miles. It drains an area of little less than 600,000 square miles. The Mackenzie received its name from Sir Alexander Mackenzie (1755-1820), by whom it was discovered and first navigated in 1789.

MACKEREL. See *Britannica*, Vol. XV, pp. 159, 160.

MACKEREL, FISHERY. See *Britannica*, Vol. IX, p. 223.

MACKEY, ALBERT G., an American writer on Freemasonry, born at Charleston, S. C., in 1807. In 1838 he became demonstrator of anatomy in the medical college of South Carolina. In 1844 he gave himself up to the pursuit of literature. His principal work is an *Encyclopædia of Freemasonry*.

MACKINAW, or MACKINAC, an island three miles long by two broad, in the Strait of Mackinaw, which connects Lakes Huron and Michigan; on the island is the village of Mackinaw, and on an eminence 200 feet above it is Fort Mackinaw.

MACLE, a term employed in mineralogy to designate what are also called *twin crystals*, crystals united according to some precise law, yet not having their faces and axes parallel, so as to render the one a mere continuation of the other.

MACLEANSBOROUGH, a village, the county-seat of Hamilton county, Ill., situated in the center of the county, and fifty miles southeast of Centralia. It is the trade center of a prosperous agricultural district.

MAC MINNVILLE, a post-village, the county-seat of Warren county, Tenn. It contains woolen and cotton mills, an iron foundry, and the Mac Minnville Female Academy.

MACOMB, a city, the county-seat of McDonough county, Ill., 200 miles southwest of Chicago. It contains a foundry, excellent schools, and is the seat of McDonough Normal College.

MACOMB, ALEXANDER (1782-1841), an American soldier. He entered the army in 1799, became captain in 1805, and major in 1808. In 1813 he was made colonel of the 3rd regiment of artillery, and

in 1814 brigadier-general. In 1828 he became major-general and general-in-chief of the army. He wrote *A Treatise on Martial Law and Court-Martials as Practiced in the United States* (1809), and *A Treatise on the Practice of Court-Martials* (1840).

MACOMB, WILLIAM HENRY (1818-1872), a United States naval officer, son of Alexander. In 1834 he entered the navy as midshipman, was made lieutenant in 1847, commander in 1862, captain in 1866 and commodore in 1870. He commanded in numerous important naval actions, always exhibiting great courage and good judgment.

MACON, a city in Georgia, beautifully located in the middle of the State. Nine railroads meet here and give excellent connections in all directions. Macon has extensive manufactories of iron, machinery, cotton-goods, cotton-seed oil, etc., and a large wholesale and retail trade. Population in 1890, 22,698. See *Britannica*, Vol. XV, p. 166.

MACON, a village, the county-seat of Noxubee county, Miss., 198 miles north of Mobile. The Mobile & Ohio Railroad shops are located here.

MACON, or MACON CITY, a railroad center and the county-seat of Macon county, Mo., 170 miles northwest of St. Louis. It has manufactories of farming-implements, wagons, etc.

MACON, NATHANIEL (1757-1837), an American statesman. He served as a private throughout the Revolution, although several offices were urged on him, and then became a member of the North Carolina senate. From 1791 to 1815 he was a United States Congressman, and then till 1828 a United States Senator.

MAC PHERSON, a city, the county-seat of Mac Pherson county, Kan., thirty-six miles south of Salina. It has flour-mills and the chief industries of the region are sheep-raising and agriculture.

MACCARTHY, DENIS FLORENCE, an Irish poet and translator, born in Dublin in 1817, died April 7, 1882. He first became known through his contributions to the "Nation." His collected *Ballads, Poems and Lyrics*, founded upon the patriotic traditions of the Irish, appeared in 1850, and in 1853 he published six of Calderon's dramas translated in the metres of the original. Further installments of the latter followed in 1861, 1867, 1870 and 1873. In 1872 appeared *Shelley's Early Life*, and in 1879 he wrote the ode for the Moore centenary. In recognition of literary merit he received a pension in 1871, and in 1881 a medal from the Royal Academy of Spain.

MAC CUNN, HAMISH, a Scotch composer, born in Greenock, March 22, 1868. After study under local teachers, in 1883, he won a scholarship at the Royal College of Music. His progress there was so rapid that in the following year he was able to resign it. In 1888 he was appointed a junior professor of harmony at the Royal Academy. He is regarded as one of the most promising composers of the day. He is a pronounced upholder of nationality in music, and his works are distinctly Scottish in character and subject.

MACDONALD, SIR JOHN ALEXANDER, an eminent Canadian statesman, was born in Glasgow, Scotland, Jan. 11, 1815, died in 1891, and with his parents emigrated five years later to Canada. He was educated at Kingston, called to the bar in 1836, and appointed a Q. C. in 1846. He represented Kingston in the Canada assembly from 1844 till the union of the provinces in 1867, and in the Dominion parliament till 1878, when he was defeated; but he afterwards sat for Victoria, British Columbia, and for Carleton and Lennox, and was again returned by his old constituency in 1887. Before the union he had been receiver-general in 1847, commissioner of crown-lands in 1847-48, attorney-general for

Upper Canada in 1854-58, succeeding Sir Allen Macnab as leader of the conservatives and premier in 1856, and again attorney-general in 1858-62 and 1864-67. In 1867, when the new constitution came into force, he was called upon to form the first government for the new dominion, and was minister of justice and attorney-general of Canada until he and his cabinet resigned in 1873. He was again returned to power in 1878, and was successful in the elections of 1882 and 1887. In 1878 his success was owing to the adoption of a policy of protection for native industries, which discriminates against the productions of all other countries, not even excepting Great Britain. Sir John was mainly instrumental in bringing about the confederation of the British North American provinces, in securing the construction of the Inter-colonial and Pacific railways. He was chairman of the London colonial conference, 1866-67, when the act of union was passed by the imperial parliament; and in 1871 was appointed one of the British commissioners for the settlement of the Alabama claims. He was made a privy-councillor in 1872, K.C.B. in 1867, and G.C.B. in 1884. He received the degree of D.C.L. from Oxford in 1865, and afterwards doctorates from three Canadian colleges.

MACDONOUGH, THOMAS (1783-1825), a United States naval officer. He entered the navy as midshipman in 1800, was promoted lieutenant in 1807, and master-commander in 1813. In August, 1814, he gained a victory over the British fleet for which he received a gold medal from Congress, and numerous civic honors from cities and towns. The Mediterranean squadron was his last command and he died while on board a trading vessel sent by the government to bring him home.

MACFARREN, SIR GEORGE ALEXANDER, an English composer, born in London, March 2, 1813, died Oct. 31, 1887. He studied at the Royal Academy of Music, where he became professor of harmony in 1838. In 1875 he was appointed principal of the academy, and also professor of music at Cambridge University. He was knighted in 1888. Macfarren's earliest dramatic work, *The Devil's Opera*, was produced in 1838, and he afterwards brought out a long series of operas, cantatas, oratorios, overtures, and sonatas, besides some hundreds of songs, many of which were popular. He stands higher, however, as a writer on the theory of music than as a composer. He wrote *Rudiments of Harmony*; *Lectures on Harmony*; *Counterpoint*; *A Musical History, and Addresses and Lectures*; besides editing *Old English Ditties*; *Moore's Irish Melodies*; *Scottish Ditties*, and the second edition of Day's *Treatise*.

MACGREGOR, a city of Clayton county, Ia., on the Mississippi River. It has good schools, and manufactories of wagons, carriages, and wind-mills.

MACGREGOR, JOHN, an English canoeist and philanthropist, born at Gravesend, Jan. 24, 1825, and educated at Dublin, and at Trinity College, Cambridge, where he graduated as a wrangler. In 1847 he entered the Inner Temple and was called to the bar in 1851. He made a tour of Europe, Egypt, and Palestine (1849-50); and a subsequent visit to the United States and Canada bore fruit in *Our Brothers and Cousins* (1859). He published an account of a canoe journey in 1865, and under the title of *A Thousand Miles in the Rob Roy Canoe*. Other narratives of canoe voyages on the Baltic, Zuyder Zee, and Jordan followed, all of which have been very popular.

MACHALE, JOHN, an Irish archbishop and author, born at Tubernavine county, Mayo, in 1791, died in 1881. After being educated at the Roman Catholic college of Maynooth, he was made

professor of theology there in 1814, and was raised to the episcopate in 1825. In 1834 he became archbishop of Tuam. He was very active in politics, in church building, in opposing the state schools, and establishing parish schools instead. He strove zealously to rehabilitate the Irish language as a literary vehicle, and translated into it many of Moore's popular melodies, six books of the *Iliad*, and a large part of the Bible.

MACKENZIE, ALEXANDER SLIDELL (1803-1848), a United States naval officer. He entered the navy in 1815 as midshipman, was made lieutenant in 1825, and commander in 1841. He was on active duty in the Mediterranean, the West Indies, the Brazilian waters, and the Pacific, and in 1846 was sent on a private mission to Cuba. In the Mexican war he was at the siege of Vera Cruz and the storming of Tabasco. He was the author of *A Year in Spain, by a Young American* (1829); *Popular Essays on Naval Subjects* (1833); *The American in England* (1835); *Spain Revisited* (1836); *Life of John Paul Jones* (1841); *Life of Commodore Oliver H. Perry* (1841), and *Life of Commodore Stephen Decatur* (1846).

MACKENZIE, SIR MORELL, M. D., was born at Leytonstone, Essex, in 1837, and educated at the London Hospital Medical College, Paris and Vienna. He founded the Hospital for Diseases of the Throat, Golden Square, London, in 1863, and in the same year obtained the Jacksonian prize from the Royal College of Surgeons for his essay on "Diseases of the Larynx." He was soon afterward elected assistant physician to the London Hospital, becoming in due course full physician, and being appointed lecturer on diseases of the throat, an appointment which he held at the time of his death. Dr. Mackenzie was in attendance on the late German Emperor Frederick during his last illness. To vindicate his treatment of the case Dr. Mackenzie published in 1888 *The Fatal Illness of Frederick the Noble*. Sir Morell Mackenzie was a corresponding member of the Imperial Royal Society of Physicians of Vienna, and of the Medical Society of Prague and an honorary fellow of the American Laryngological Association. He was the author of numerous publications on laryngological subjects, and in particular of a systematic treatise in two volumes on *Diseases of the Throat and Nose*, which is acknowledged to be a standard work. It has been translated into French and German, and is well known in America.

He also wrote monographs on diphtheria and hay fever, and he published an article on *Specialism in Medicine*, in the June number of the "Fortnightly Review" (1865), which excited considerable attention. In 1889 he contributed to the "Contemporary Review" some essays, entitled *The Voice in Singing and Speaking*.

He was the author of the most exhaustive work on throat disease. Although the first volume appeared over twenty-two years ago it is yet standard. He was a very conservative man in operative work, but was exceedingly skillful. He had invented many new instruments, and improved numerous old ones. Personally he was exceedingly amiable to everybody, rich or poor, and made people at once feel at home with him. Being a great linguist he was very fond of addressing people in their own language. He spoke German, French and Italian fluently, and was a thorough classical scholar. He died in London, Feb. 3, 1892, from influenza, from which he had been suffering but a few days.

MCALDER, WILLIAM, an American statesman, born in County Tyrone, Ireland, June 6, 1838. He came to Philadelphia with his parents in 1861; was

educated in the public and private schools; was president of the commercial exchange, and a director of the chamber of commerce of Philadelphia. In politics he is a Democrat, and served two years as a member of the common council. In 1873 he was elected a member of the Board of Guardians of the Poor of Philadelphia for a term of three years, and was reelected for five consecutive terms; was elected a State senator in 1876, serving four years. In 1890 was elected a Representative from the 3rd Congressional district of Pennsylvania to the 52nd Congress.

MCALL MISSION, the largest Protestant mission in France. It was started in 1871 by the Rev. R. W. McAll and his wife, and is there known as "Mission Populaire Evangélique de France." Mr. McAll was a Scotch clergyman in charge of a parish. He and his wife visited Paris after the Commune was suppressed and distributed tracts among the people there. In November of the same year they moved to Paris and lived there. They opened meeting-houses, preached, exhorted, prayed and sang, and taught Sunday-schools and Bible-classes. The mission grew, the stations increased, so that the McAll Mission possesses now over 100 stations (some forty-odd in Paris alone). It is indorsed by the clergymen of all Protestant churches, and supported by Protestant Christians in England, Scotland, America, Canada, Australia and Switzerland.

MCCABE, CHARLES C., an American clergyman, popularly known as "Chaplain McCabe," born at Athens, Ohio, Oct. 11, 1836. He became a traveling Methodist minister in 1860; chaplain of infantry in 1862; was taken prisoner at the battle of Winchester in 1863, and upon his release made the tour of the Union in the interest of the Christian Commission. Since the war he has traveled in the interest of the Board of Church Extension, and in 1884 he was elected missionary secretary of the Methodist Episcopal church.

MCCALL, GEORGE ARCHIBALD (1802-1866), an American soldier. From 1831 to 1836 he served as aide to Gen. E. P. Gaines, and then in the Florida and Mexican wars, receiving the brevets of major and lieutenant-colonel. From 1850 to 1853 he was inspector-general of the army. In 1861 he was made brigadier-general, and after two years of active service resigned on account of poor health. He wrote *Letters from the Frontier* (1868).

MCCARTHY, JUSTIN, an Irish journalist, author and statesman, born in Cork, Nov. 22, 1830. He became attached to the staff of the "Northern Times," Liverpool, in 1853, and in 1860 entered the reporters' gallery of the house of commons for the "Morning Star," becoming its foreign editor the following autumn and chief editor three years later. He resigned his post in 1868 and devoted the next three years to an unusually complete tour of the United States. Soon after his return he became connected with the "Daily News," but he has also contributed among other magazines to the "London," the "Westminster" and the "Fortnightly Review." He entered the house of commons in 1879 as member for Longford, and has identified himself throughout with the Home-rule party. In 1890 he was chosen as leader of the Irish Parliamentary party in place of Mr. Parnell. McCarthy's novels have, perhaps, extended his name farther than his political triumphs. His other works are *Con Amore*, a collection of essays, *Critical Notice of George Sand*; *Prohibitory Legislation in the United States*; *Modern Leaders*, and *A History of our Own Times*, an exceedingly readable work, clear and useful, though neither erudite nor exhaustive. In 1889 he published his popular *History of the Four Georges*.

McCHEYNE, ROBERT MURRAY, an eminent Scotch divine, who has been called "the George Whitefield of Scotland," born at Edinburgh, May 21, 1813, died at Dundee, March 25, 1843. He was educated at the high school and university of his native town, and licensed as assistant preacher in Larbet and Dunipace in 1835. The scene of his life-work was Dundee; he was elected minister of the new church of St. Peter's there in 1836, and labored in the same parish until his death. In 1839 he visited Palestine as one of a mission of four ministers sent out by the church of Scotland to inquire into the condition of the Jews, and on his return published, in conjunction with A. A. Bonar, *Narrative of a Mission of Enquiry to the Jews*. Besides being an eloquent preacher, a man of saintly piety and a most exemplary parish minister, McCheyne wrote hymns and published sermons, both of considerable merit.

McCLELLAN, GEORGE (1796-1847), an American surgeon. In 1819 he began the practice of medicine in Philadelphia, and from 1826 to 1833 was professor of surgery in Jefferson Medical College. From 1839 to 1843 he held a similar office in the medical department of Pennsylvania College. Dr. McClellan left in manuscript *The Principles and Practice of Surgery*.

McCLELLAN, GEORGE BRINTON (1826-1885), an American soldier. See *Britannica*, Vol. XXIII, p. 789.

McCLEARNAND, JOHN ALEXANDER, an American lawyer, born in 1812. In 1832 he began the practice of law in Shawneetown, Ill., and in 1835 established the Shawneetown "Democrat." From 1836 to 1842 he was a member of the State legislature, and from 1843 to 1851 served in Congress. In 1859 he was again chosen to Congress, and served till the beginning of the civil war, when he resigned and was appointed brigadier-general of volunteers in the Union army. He was present at many important battles, and gained the rank of major-general. In 1864 he resigned from the army.

McCLINTOCK, SIR FRANCIS LEOPOLD, a British explorer, born in 1819. At the age of 12 he entered the navy, and in 1845 was promoted to a lieutenantancy. He was a member of an Arctic expedition sent in search of Sir John Franklin in 1843, and of another sent out in 1849. In 1851 he was promoted to the rank of commander, and put in charge of the "Intrepid," one of the five vessels sent to the polar regions under Sir Edward Belcher. In 1857 Lady Franklin gave him the command of the expedition sent out by her, which resulted in solving the mystery of Sir John Franklin's fate. In 1860 he was knighted; in 1871 was made rear-admiral; in 1877 vice-admiral, and in 1884 full admiral. He is the author of *The Voyage of the "Fox" in the Arctic Seas* (1860).

McCLINTOCK, JOHN (1814-1870), an American educator. In 1835 he began to preach in the New Jersey conference of the Methodist Episcopal church, and in 1836 became professor of mathematics in Dickinson College, Carlisle, Pa. In 1840 he exchanged the mathematical chair for that of Greek and Latin, and from 1848 to 1856 was editor of the "Methodist Quarterly Review." In 1857 he became pastor of St. Paul's church, New York City, and from 1860 to 1864 was pastor of the American chapel in Paris. He then returned to the pastorate of St. Paul's church, but was compelled to resign in 1865 on account of failing health. In 1867 Dr. McClintock was chosen the first president of Drew Theological Seminary at Madison, N. J. He is the author of a *Cyclopedia of Biblical, Theological and Ecclesiastical Literature*; *Sketches of Eminent Methodist Ministers*, and *The Temporal Power of the Pope*, besides numerous translations.

McCLOSKEY, JOHN (1810-1885), an American Roman Catholic cardinal. In 1834 he was ordained priest, and in 1837 was appointed pastor of St. Joseph's Church, New York City. In 1841 he became the first president of Fordham College, New York, but held the post only a year. In 1844 he was consecrated bishop, and made coadjutor of the diocese of New York. In 1864 he was made archbishop, and in 1875 was created cardinal.

McCOOK, ALEXANDER McDOWELL, an American soldier, born in 1831. He entered the army in 1852, and served against the Apaches till 1857. From 1858 to 1861 he was instructor of infantry tactics at West Point, and then became a colonel of the 1st Ohio regiment. He commanded in the first battle of Bull Run, in the Tennessee and Mississippi campaign, and in the campaigns of Perryville, Stone River, Tullahoma, and Chickamauga, and was engaged in the defense of Washington. In 1880 he was appointed colonel of the 6th infantry, and later became commandant of the school of instruction for infantry and cavalry at Fort Leavenworth, Kan.

McCOOK, DANIEL (1834-1864), an American soldier. He was admitted to the Ohio bar in 1860, and then removed to Leavenworth, Kan. At the beginning of the civil war he became a captain in a local company of volunteers, and served at Wilson's Creek. He then served as chief of staff of the 1st division of the army of the Ohio in the Shiloh campaign, and in 1862 became colonel of the 52nd Ohio infantry. In 1864 he was selected to lead the assault that was made on Kenesaw Mountain, and took his brigade directly up to the Confederate works. On reaching the top of the enemy's works he was fatally wounded and died a few days later.

McCOOK, EDWIN STANTON (1837-1873), an American soldier. When the civil war began he raised a company for the 31st Illinois regiment, and served at Fort Henry, Fort Donelson, in the Vicksburg, Chattanooga, Atlanta, and other campaigns, and in the march to the sea under Sherman. Gen. McCook was three times severely wounded, and received the brevet of major-general of volunteers. He was shot and killed in Yankton, Dak., while presiding over a public meeting.

McCOOK, HENRY CHRISTOPHER, an American clergyman, born in 1837. He served as first lieutenant and chaplain in the army, and then held pastorates at Clinton, Ill., and St. Louis, Mo. In 1869 he was made pastor of the 7th Presbyterian church of Philadelphia. He has written *Object and Outline Teaching* (1871); *The Last Year of Christ's Ministry* (1871); *The Last Days of Jesus* (1872); *The Tercentenary Book* (1873); *The Mound-Making Ants of the Alleghenies* (1877); *Historic Ecclesiastical Emblems of Pan-Presbyterianism* (1880); *The Natural History of the Agricultural Ant of Texas* (1880); *Honey and Occident Ants* (1882); *Tenants of an Old Farm* (1884); *The Woman Friends of Jesus* (1884); *The Gospel in Nature* (1887); and *American Spiders and their Spinning Work* (1888).

McCOOK, ROBERT LATIMER (1827-1862), an American soldier. He acquired a large law practice in Cincinnati, Ohio. In 1861 he organized the 9th Ohio regiment, and was made its colonel. He served with distinction in several battles, and was promoted brigadier-general of volunteers. He was shot while lying in an ambulance on the battlefield near Salem, Ala.

McCOOK, RODERICK SHELDON (1839-1886), a United States naval officer. He entered the navy in 1859, became lieutenant in 1861, lieutenant-commander in 1865, and commander in 1873. During the civil war he served with distinction in several

important engagements. On account of failing health he retired from active service in 1885.

MCCORMICK, CYRUS H., the inventor of the reaping-machine, born at Walnut Grove, Va., Feb. 15, 1809, died in 1884. He went to Cincinnati in 1845, and to Chicago in 1847. His reaper, patented in 1834, won him wealth and distinction. He was a liberal promoter of education, and founder of the Theological Seminary of the Northwest.

MCCORMICK, RICHARD C., an American author and statesman, born in New York City in 1832, where he was successively a man of business, a journalist, and trustee of public schools. In 1862 he became chief clerk of the department of agriculture. He was governor of Arizona 1866-69, and delegate to Congress 1869-75. In 1878 he was commissioner-general of the United States to the Paris Exposition, and received the decoration of the Legion of Honor.

MCCOSH, JAMES, an American educator, born in Scotland in 1811. In 1835 he was ordained minister of the Church of Scotland, and held pastorates in various places till 1862 when he became professor of logic and metaphysics in Queen's College, Belfast, Ireland. Here he remained till 1868 when he removed to the United States, having been elected president of Princeton College. He resigned the presidency of the college in 1888, but retained the chair of philosophy. Dr. McCosh has written *Method of Divine Government, Physical and Moral* (1850); *Typical Forms and Special Ends in Creation* (1855); *Intuitions of the Mind Inductively Investigated* (1860); *The Supernatural in Relation to the Natural* (1862); *Examination of Mill's Philosophy, being a Defense of Fundamental Truth* (1866); *Laws of Discursive Thought, being a Treatise on Formal Logic* (1869); *Christianity and Positivism* (1871); *The Scottish Philosophy, Biographical, Expository, Critical from Hutcheson to Hamilton* (1874); *A Reply to Prof. Tyn-dall's Belfast Address* (1875); *The Development Hypothesis* (1876); *The Emotions* (1880); and *Philosophical Series* (1886).

MCCULLOCH, BEN (1811-1862), an American soldier. He supported the Texan revolutionists in their struggle for independence, and in 1839 was elected to the congress of Texas. In 1845 he became a member of the first legislature, and was made major-general of the state militia. At the beginning of the Mexican war he raised a company of Texas rangers, and later showed great courage as a spy. In 1852 he was appointed United States marshal, and in 1857 was appointed a commissioner to adjust the difficulties with the Mormons of Utah. In 1861 he was made a brigadier-general in the Confederate army, and did good service in several engagements. He was killed by the bullet of a sharp-shooter while reconnoitering.

MCCULLOCH, HUGH, a Secretary of the United States Treasury, born in 1808. He studied law in Boston, and then went to Fort Wayne, Ind., where, in 1835, he became cashier of a branch of the State bank. From 1856 to 1863 he was president of the bank of the State of Indiana, and then became comptroller of the currency. In 1865 he was appointed Secretary of the Treasury, and held office till 1869. From 1871 to 1878 he was engaged in banking in London, and in 1884 was again appointed to the office of Secretary of the Treasury, holding the post till the end of Arthur's Administration.

MCCULLOUGH, JOHN EDWARD (1837-1885), an American actor. In 1855 he made his first appearance in Philadelphia, in a minor character in "The Belle's Stratagem," and then chose the stage as a regular profession. From 1866 to 1868 he traveled with Edwin Forrest, and from 1869 to 1872 man-

aged the Bush street theatre in San Francisco. From 1873 to 1884 the tragedian appeared through the United States in the heroic rôles of "Brutus," "Jack Cade," "The Gladiator," "Virginius," and "Damon and Pythias." He then became prostrated, mentally and physically, and ended his days in a lunatic asylum.

MCDONALD, EDWARD F., an American statesman, born in Ireland, Sept. 21, 1844. He came to the United States with his parents while an infant and received a common school education. In politics he is a Democrat. In 1874 he was elected a member of the New Jersey assembly, and in 1877 and 1879 was a member of the board of Chosen Freeholders of Hudson county, N. J. In 1889 he was elected a State senator, and in 1890 was elected a Representative from the 7th Congressional district of New Jersey to the 52nd Congress. He served in the Union army during the war of the Rebellion.

MCDONALD, GEORGE, a British poet and novelist, born at Huntley, Aberdeenshire, in 1824. He studied theology with the intention of becoming a Congregational minister, but he decided afterwards to devote himself entirely to literature. His views are extremely broad and liberal, and his style of writing has a peculiar charm. His best known works are *David Elginbrod* (1862); *Alec Forbes of Howglen*; *Annals of a Quiet Neighborhood*; *Seaboard Parish*; *Robert Falconer*; *Wilfried Cumbermede*; *The Portend, a Story of Second Sight*; *Thomas Winfield, Curate*; *The Marquis of Lossie*; *At the Back of the North-wind*; *The Gifts of the Child Christ*; and *The Miracles of our Lord*. In 1877 he received a pension of £100, in consideration of his literary services. Dr. McDonald is also an eloquent preacher and lecturer, and pays annual visits to England from Bordighera where he resides. All his works are full of poetry, and of high moral and religious purpose.

MCDOWELL, IRVIN (1818-1885), an American soldier. In 1838 he became a 2nd lieutenant in the 1st artillery of the United States army, and served till 1841 on the northern frontier. From 1841 to 1845 he was instructor of infantry tactics at the United States military academy, and then became aide-de-camp to General John E. Wool. In 1848 he was appointed adjutant-general in the war department in Washington, and in 1856 attained the rank of major. In 1861 he was made brigadier-general, and commanded the department of north-eastern Virginia, and the defenses of Washington, and also the army of the Potomac at the battle of Bull Run. In 1864 he was given the command of the department of the Pacific; in 1866 of California; in 1868 of the East, and in 1872 of the South. In 1882 he retired from active service, having gained the rank of major-general.

MCDUFFIE, GEORGE (1788-1851), a governor of South Carolina. He was admitted to the bar in 1814, and in 1818 was sent to the South Carolina legislature. In 1821 he was chosen to Congress as a Democrat, and served until 1834. He was then elected governor of his State, which office he held till 1836, when he retired to private life. From 1842 to 1846, he was a United States Senator. He published, besides numerous addresses, an "Eulogy on Robert Y. Hayne" (1840).

McGEE, THOMAS D'ARCY (1825-1868), a Canadian statesman. For a time he was editor of the Boston, Mass., "Pilot," and then went to Ireland where he was on the staff of the Dublin "Freeman's Journal," and later of "The Nation." In 1848 he established in New York "The American Celt," and then "The Nation." Subsequently he settled in Canada, and established a paper called "The New Era." In 1857

he was chosen to the Canadian parliament, and from 1864 to 1867, was president of the executive council. On the evening of April 7, 1868, when returning from a night session of parliament, he was assassinated at the door of his hotel. He wrote *Historical Sketches of O'Connell and his Friends* (1845); *Irish Writers of the Seventeenth Century* (1846); *Memoir of the Life and Conquests of MacMurrough, King of Leinster* (1847); *Irish Letters* (1852); *Life of Edward McGinn, Coadjutor Bishop of Derry* (1857); *Canadian Ballads* (1858); *Popular History of Ireland* (1862), and *Speeches and Addresses on the British American Union* (1865).

McGLYNN, EDWARD, an American clergyman, born in 1837. In 1860 he was ordained to the Roman Catholic priesthood, and in 1866 became pastor of St. Stephen's church in New York City. In 1886, on account of his ignoring the papal demands to appear at the Vatican on a charge of his support of Henry George's land theories, he was excommunicated. In 1887 Doctor McGlynn became president of the anti-poverty society, and in behalf of his economic opinions, he has lectured in nearly all of the principal cities of the United States.

McGUFFEY, WILLIAM HOLMES, an American educator, born in Washington county, Pa., in 1800, died at Charlottesville, Va., May 5, 1873. He became professor in Miami University in 1836; president of Ohio University in 1839, and professor of moral philosophy in the University of Virginia in 1845. He is best known for his school books, especially his popular series of readers.

MCLLVAIN, CHARLES PETTIT (1799-1873), an American Protestant Episcopal bishop. In 1820 he was made deacon, and in 1821 priest. He became pastor of Christ church, Georgetown, D. C., and later was appointed professor of ethics in the United States military academy. In 1827 he was called to St. Ann's church, Brooklyn, N. Y., and in 1831 was made professor of sacred antiquities in the university of the City of New York. In 1832 he was elected bishop, and chosen president of Kenyon College. He published *Lectures on the Evidences of Christianity* (1832); *Oxford Divinity Compared With That of the Roman and Anglican Churches, With a Special View of the Doctrine of Justification by Faith* (1841); *The Holy Catholic Church* (1844); *No Priest, no Altar, no Sacrifice, but Christ* (1846), and *Reasons for Refusing to Consecrate a Church Having an Altar* (1846), besides numerous sermons and addresses.

McINTOSH, JAMES SIMMONS (1787-1847), an American soldier. In 1812 he entered the United States army as lieutenant, and served throughout the Greek war. In 1817 he became a captain, in 1836 major, and in 1839 lieutenant-colonel. He participated in several important battles of the Mexican war, and was mortally wounded in the assault on Molino del Rey.

McINTOSH, JOHN, an American general, born in McIntosh county, Ga., in 1755, died there in 1826. He served in the Revolutionary war as a lieutenant-colonel of the Georgia militia, defending the fort at Sunbury, in Liberty county, when it was besieged by a strong British force. At the battle of Briar Creek, March 3, 1779, he displayed great bravery, surrendering only when further resistance was impossible. During the last months of the war of 1812-14, he served under Jackson as major-general of the Georgia militia.

McINTOSH, LACHLAN (1725-1806), an American soldier. At seventeen years of age he entered a counting-house in Charleston, S. C., and subsequently became a land-surveyor at Inverness (now Darien), Ga. In 1776 he was appointed brigadier-general of militia, and two years later accepted a command in the central army under Washington,

doing good service throughout the war. In 1784 he was a member of Congress.

McINTOSH, MARIA JANE (1803-1878), an American authoress. Her first work was *Blind Alice*, published in 1841 under the pen-name of "Aunt Kitty," and from that time she devoted her life to literature. Among her most popular works are *Conquest and Self-Conquest* (1844); *Praise and Principal* (1845); *Two Lives, to Seem and to Be* (1846); *Charms and Counter Charms* (1848); *Woman in America, Her Work and Reward* (1850); *The Lofty and the Lowly* (1852); *Evenings at Donaldson Manor* (1852); *Emily Herbert* (1855); *Violet, or the Cross and Crown* (1856); *Meta Gray* (1858), and *Two Pictures* (1863).

McKEAN, THOMAS (1734-1817), a signer of the Declaration of Independence. In 1754 he was admitted to the Delaware bar, and the following year became deputy attorney-general of Sussex county. From 1762 to 1779, he was a member of the general assembly, and in 1765 was elected to the stamp-act Congress. The same year he became judge of the court of common pleas, collector of the port of New Castle in 1771, Speaker of the House of Representatives 1772, and from 1774 to 1783, was member of the Continental Congress. From 1799 to 1808, he was governor of Pennsylvania.

McKEESPORT, a borough of Allegheny county, Pa., on the Monongehela River, fifteen miles southeast of Pittsburgh. It has flour, saw, and rolling mills, large manufactories of iron-pipes, glass works foundries, machine-shops, and a distillery. Natural gas is used for fuel to some extent. Population in 1880, 8,912; in 1890, 20,711.

McKENDREE, WILLIAM, an American Methodist bishop, born in Virginia, July 6, 1757, died in 1835. Originally a revolutionary officer, he became a preacher in 1788, presiding elder in 1796, and bishop in 1808. He was largely instrumental in planting Methodism west of the Alleghenies and in founding McKendree College at Lebanon, Ill., to which institution he bequeathed 480 acres of land. After 1816 he was senior bishop for 19 years. He was eloquent in the pulpit, and careful in the administration of discipline, and introduced system into all the operations of the church.

McKINLEY, WILLIAM, an American statesman, born at Niles, Ohio, Feb. 26, 1844. He enlisted in the United States army in May, 1861, as a private soldier in the 23d Ohio Volunteer Infantry, and was mustered out as captain of the same regiment and brevet-major in September, 1865, was prosecuting attorney of Stark county, Ohio, 1869-71; was elected to Congress in 1877; lost his seat by vote of the House in 1884; was reelected and sat continuously as a member of Congress from 1885 to March 4, 1891. He is author of the protective tariff bill passed by Congress in 1890. See *TARIFF* and *UNITED STATES*, in these Revisions and Additions.

McKINNEY, a village, the county-seat of Collin county, Texas. It has large flour-mills and is situated in a grain and stock-raising locality.

McKINNEY, LUTHER F., an American statesman and divine, born in Licking county, Ohio, April 25, 1841. He received a common school education; served as a sergeant in the Union army from 1861-1863; removed to Iowa in 1865, and spent two years in farming and teaching. In September, 1867, he entered the Saint Lawrence University, New York, graduating in 1870; removed to Maine and entered the ministry; removed to New Hampshire in 1873. In politics he is a Democrat, and was elected a Representative from the 1st Congressional district of New Hampshire to the 60th Congress. In 1890 he was elected from the same district to the 52nd Congress.

McLANE, Louis (1786-1857), an American statesman. From 1798 to 1801 he was in the United States navy, and then studied law and was admitted to the Delaware bar in 1807. From 1817 to 1827 he was a Democrat in Congress, and then till 1829 served as a United States Senator. From 1829 to 1831 he was minister to England, and then became Secretary of the Treasury. In 1834 he retired from political life, and from 1837 to 1847 was president of the Baltimore & Ohio Railroad Company. In 1845-6 he again served as minister to England.

McLANE, ROBERT MILLIGAN, an American diplomat, born in 1815. In 1837 he joined the army and took an active part in the Seminole war as a lieutenant. In 1839 he was on a military survey of the northern lakes, and in 1841 went to Europe to examine the system of dykes and drainage in Holland and Italy. In 1843 he began the practice of law at the Delaware bar, and in 1845, 1847, and 1849 was elected to Congress. From 1854 to 1856 he was United States commissioner to China, and in 1859 was appointed minister to Mexico. In 1877 he was elected to the United States Senate, and in 1888 to the House of Representatives, receiving a reelection in 1890. In 1883 he became governor of Maryland, and in 1885 was appointed minister to France.

McLAWS, LAFAYETTE, an American soldier, born in 1821. He entered the United States army in 1842 and was in active service till 1861, when he became a colonel in the Confederate army. A little later he was commissioned a brigadier-general, and in 1862 was promoted major-general. He participated in nearly all the important battles of the civil war, and at the close went into business at Savannah, Ga. In 1875 he was appointed collector of internal revenues in that city, and the following year was made post-master. In 1886 he opened a series of lectures in Boston by northern and southern military leaders, his subject being "The Maryland Campaign."

McLEAN, JOHN (1785-1861), an American jurist. In 1807 he began the practice of law at Lebanon, Ohio, and in 1812 was elected to Congress, receiving a reelection two years later. From 1816 to 1822 he was judge of the State supreme court, and then was appointed commissioner of the general land office. From 1823 to 1829 he was post-master-general, and in 1830 became associate justice of the United States Supreme Court. He wrote *Reports of the United States Circuit Court* (1829-1855); and *Eulogy on James Monroe* (1831), besides several addresses.

McMAHON, MARIE EDMÉ PATRICE MAURICE DE, DUC DE MAGENTA, marshal of France and second president of the French Republic, born at Sully Saône-et-Loire, in 1808. He came from an Irish Catholic family settled in France. He was educated at the military school of St. Cyr, and took part in the expedition to Algiers. McMahon distinguished himself in the assault on Constantine in 1837. In 1845 he rose to be colonel; in 1848 general of brigade, and in 1852 general of division. During the Crimean war he captured by a spirited assault the Malakoff, which was the key to the defenses of Sebastopol. For this achievement he was made a Senator in 1859. At the opening of the Italian war in 1859 he commanded the second corps of the army of the Alps. At the battle of Magenta, on June 4, he arrived just in time to make it a decisive victory. For this service he was created Duke of Magenta and marshal of France.

In 1870 when the Franco-Prussian war broke out McMahon commanded the first army corps which had to defend Alsace. But he was defeated at Wörth and afterwards at Sedan. At the latter

place he was chief in command, but was wounded at the beginning of the engagement. In 1871, as chief of the army at Versailles, he wrested Paris from the commune. When Thiers resigned the presidency in 1873, McMahon was chosen to succeed him; but he was too conservative for the majority of the Republicans. When the latter demanded the removal of some Bonapartist generals, McMahon resigned the presidency, Jan. 30, 1879. He has since lived in retirement.

McNAB, SIR ALLEN NAPIER, a Canadian statesman, born at Niagara in 1798, died at Toronto in 1862. In the war of 1812 he served as midshipman in expeditions against Sackett's Harbor and other American ports on Lake Ontario, and afterwards as ensign in the army. After that war he studied law. Subsequently he was made clerk in the assembly of Upper Canada, and finally he became speaker of that body. In the insurrection of 1837 McNab was colonel of the militia on the Niagara frontier and routed the insurgents near Toronto. When their leader, W. L. Mackenzie, took Navy Island and received reinforcements and supplies by the steamer *Caroline* from the American side, McNab seized and burnt the steamer and sent her adrift over the falls. He was speaker of the united provinces of Canada in 1844, prime-minister, 1846-56, and a member of the legislative council in 1860. He was made a baronet in 1858.

McPHERSON, JAMES BIRDSEYE (1828-1864) an American soldier. He entered the army in 1853, became 2nd lieutenant in 1854, lieutenant in 1858, captain and lieutenant-colonel in 1861, colonel, brigadier-general of volunteers, and major-general of volunteers 1862, and brigadier-general in the regular army, 1863. He took part in many important battles of the civil war, always displaying a correct judgment, coolness in danger, quick perception, knowledge of ground, and untiring energy. He was killed near Atlanta, Ga., while in command of the Army of the Tennessee. His statue in bronze stands in one of the public parks of Washington.

McTYEIRE, HOLLAND NIMMONS, an American bishop of the Methodist Episcopal church, South, born in 1824. He joined the Virginia conference in 1845, and the following year took charge of St. Francis street church, Mobile, Ala. Afterwards he was stationed at Demopolis, Ala., Columbus, Miss., and New Orleans, La. In 1851 he became editor of the New Orleans "Christian Advocate," and in 1858 of the Nashville "Christian Advocate." During the civil war he was pastor at Montgomery, Ala., and in 1866 was elected to the episcopate. In 1873 he became president of the board of Vanderbilt University. He has written *Duties of Christian Masters* (1851); *Catechism on Church Government* (1869); *Catechism on Bible History* (1869); *Manual of Discipline* (1870) and *History of Methodism* (1884).

McVEAGH, WAYNE, born in Phoenixville, Pa. April 19, 1833; admitted to the bar in 1856; captain of cavalry, 1862; minister to Constantinople, 1872; member of the commission to investigate the affairs of Louisiana in 1877; appointed attorney-general of the United States in 1881; resigned in 1881.

McWHINNEY, THOMAS MARTIN, D. D., an American minister, born in Ohio in 1823, and educated at Oxford University, Ohio, and at the Meadville Theological School, Pa. During the civil war he was appointed chaplain of the 57th Indiana Volunteers. He has been editor of the "Herald of Gospel Liberty." He was called to the pastorate of St. Paul's Evangelical church, 34th Street, New York City in 1881, which position he occupied for six years. He is now (1891) pastor of the First Christian church of Marion, Ind. Union Christian College, Ind., conferred upon him the degree of Doctor of Divinity.

He is the author of *Crime Legalized; Heavenly Recognition, and Reason and Revelation*, which latter work has gone through several editions.

MACWHIRTER, JOHN, artist, was born in 1839 near Edinburgh. Apprenticed early to a bookseller and publisher, he ran away in disgust, and commenced his artist life. His early studies of wild-flowers at home and abroad were selected by Ruskin as examples for his Oxford class. In 1864 he was elected Associate of the Scottish Academy, and in 1870 A.R.A. He excels in depicting Highland scenery, but he has traveled much, and one of his most admired works is a view of Constantinople and the Golden Horn (1889). As favorites may be mentioned *The Vanguard*, *The Lady of the Woods*, *The Three Graces* and *Out in the Cold*.

MADAGASCAR. For general article on MADAGASCAR see *Britannica*, Vol. XV, pp. 168-176. The area of the island is now estimated at 228,500 square miles; total length, 975 miles, breadth at widest point 358 miles. Population, about 3,500,000.

No census has ever been undertaken by the native government, and it resents any attempt at census taking by foreigners. It is therefore only by vague and uncertain estimates that any idea can be formed of the population of the island as a whole or of that of particular districts.

There are reasons for thinking that the population of Imérina was decreasing during the sanguinary reign of Queen Ranavalona I. (1828-1861); but it is believed that it is now slowly increasing in consequence of the spread of education, civilization, and Christian teaching. The female population seems in excess of the male. A number of foreign residents live on the coasts, chiefly Creoles from Mauritius and Bourbon, mostly English subjects. The most powerful, intelligent, and enterprising tribe is the Hova, whose language allied to the Malayan and Oceanic tongues is understood over a large part of the island, and who have been dominant for the last fifty years. The people are divided into a great many clans, who seldom intermarry. The Hovas are estimated to number 1,000,000; the other races, more or less mixed, are the Sakalavas in the west, 1,000,000; the Betsileos, 600,000; Bavas, 200,000; Betsimisaraka, 400,000; Antalaves, 200,000. In the coast towns are many Arab traders and there are besides many negroes from Africa introduced as slaves. The capital, Antananarivo, in the interior, is estimated to have, with suburbs, a population of 100,000. The principal port is Tamatave, on the east coast, with a population of 10,000. Mojangah, the chief port on the north-west coast, has about 14,000 inhabitants. Slavery exists in a patriarchal form.

PRESENT REIGNING FAMILY AND GOVERNMENT.—Queen Ranavalona (or Ranaivalona) III. was born about 1861; appointed successor by the late Queen Ranavalona II.; succeeded to the throne on her death, July 13, 1883; shortly after she married the prime minister, Rainilaiarivony, and was crowned Nov. 22, 1883.

The present queen is great-granddaughter of Rabehy, sister of King Andrianampoinimerina (1787-1810). At various periods, 1820, 1861, 1865, and 1868, treaties have been concluded with Great Britain, the United States, and France. By a treaty signed at Tamatave, Dec. 12, 1855, a French resident-general, with a small military escort, resides at the capital, and the foreign relations of the country are regulated by France, which occupies a district around the Bay of Diego-Suarez as a colony. But the native government has retained the right of receiving the *exequaturs* of foreign consuls, and has maintained its right of direct negotiation with foreign powers in all commercial matters; and it retains absolute independence in all domestic legislation and control of the other tribes of the country.

The government is an absolute monarchy, modified and tempered by customs and usages having the force of law; and during the last quarter of a century the power of the sovereign has been gradually limited and controlled.

REVENUE AND FINANCE.—The chief source of revenue is the customs, and a small poll tax is paid; but the personal service which every Malagasy has to render is the mainstay of the government. The only fixed payments are those made to the queen, the prime minister, and the army. In 1886 the Malagasy government borrowed from the *Paris Comptoir d'Escompte* a sum of 15 millions francs, of which 10 millions went to pay the indemnity to France. No statistics of public revenue are obtainable.

MADISON, a village, the county-seat of Morgan county, Ga., about seventy miles from Atlanta. The cotton trade is the chief business, and granite and iron ore are found here.

MADISON, a city of Indiana. Population in 1870, 10,709; in 1880, 8,945; in 1890, 8,923. See *Britannica*, Vol. XV, p. 181.

MADISON, a post-village of Morris county, N. J., twenty-eight miles from New York. It is the home of many New York business men. It manufactures screws and contains Drew Theological (M.E.) Seminary.

MADISON, the capital of Wisconsin and seat of justice of Dane county, lies toward the south of the State, seventy-five miles west of Milwaukee. In the beauty of its situation it has few rivals, occupying as it does the undulating isthmus between Mendota and Monona, two of the lakes which give name to the Four-Lake Region, connected with the Mississippi by Yahara or Catfish River and Rock River; and the cool summer climate, which it owes to the fact that it stands 788 feet above the level of the sea and 210 feet above Lake Michigan, renders it a health resort of some value, especially for consumptive patients. The State capitol, situated in the midst of a finely wooded park of thirteen acres, is a rather imposing but hybrid edifice of white limestone crowned by a central dome rising 200 feet above the level of the basement; it was originally built in room of an earlier capitol in 1860, at a cost of \$400,000, and has since been greatly enlarged. Population 1890, 13,302.

MADISONVILLE, a post-village, the county-seat of Hopkins county, Ky. It is situated in a tobacco growing region, and contains tobacco-stemmeries, a pearlsh and potash factory, flour and planing mills, a cotton gin, and wagon and carriage manufactories. Coal fields are in the vicinity.

MÄDLER, JOHANN HEINRICH, a German astronomer, born at Berlin in 1794, died at Hanover, in 1874. While a teacher in the normal school at Berlin he constructed a map of the moon, which was published in 1836. After this he became successively director of the observatory at Berlin, and at Dorpat, Russia, where he made important observations on Mars and Jupiter, and on double and variable stars. He published *Populäre Astronomie* (1841); *Allgemeine Selenographie, und Geschichte der Himmelskunde* (1873). In his work *Die Centralsonne* he presented the hypothesis of a central sun, around which the whole stellar universe revolves. He named the star Alcyone as the central sun.

MADOC, a post-village in Hastings county, Ontario, twenty-eight miles north of Belleville. It has good water-power, and marble, iron and gold are found in the vicinity.

MADSTONE, a stone popularly reputed to be a cure for hydrophobia and snake bites. The stone is applied to the wound, from which it is supposed to absorb the virus. Madstones are credited with remarkable cures by many people, but the belief in their value has no scientific sanction.

MADVIG, JOHANN NIKOLAI, a Danish statesman and philologist, of Jewish descent, born at Svaneke, Bornholm, in 1804, died in 1888. After being educated at the University of Copenhagen he was made professor of the Latin language and literature there. He published editions of *Livy*, *Juvenal*, *Cicero*, and *Lucretius*, a *Latin Grammar*, and *Adversaria Critica ad Scriptores Græcos et Latinos* (1871-84); also *Die Verwaltung des römischen Staates* (1882). In 1848 Madvig was minister of public worship, and in 1852 minister of public instruction. Afterwards he was again professor of classical philology at the University of Copenhagen. He excelled in the knowledge of the classics.

MAFFITT, JOHN NEWLAND (1795-1850), an American clergyman. Born in Ireland, in 1819 he emigrated to America and in 1822 entered the New England conference of the Methodist Episcopal church. In 1832 he became a local preacher in New York City and an evangelist. In 1833 he established at Nashville, Tenn., the "Western Metho-

dist," afterwards the "Christian Advocate," and later was for a short time professor of elocution in La Grange College, Ala. In 1841 he became chaplain to the National House of Representatives, and in 1145-46 edited at Auburn, N. Y., the "Calvary Token." Toward the close of his life his popularity waned, and his mind was troubled by charges which were brought against his moral character. He wrote *Tears of Contrition* (1821); *Pulpit Sketches* (1828); and a volume of *Poems* (1839).

MAFIA, or **MAFFIA** a secret Italian organization with a history dating its origin probably in Sicily, and having for its present object the enforcement of private vengeance.* In Southern Italy, and specially in Sicily, its membership was largely made up of murderers and assassins. Its ramifications extended into some cities and towns of the United States, and in New Orleans, where a large Italian population has gathered during several years past, the murderous work of the Mafia in 1888, 1889, and 1890, was constantly on the increase and in June, 1890, culminated in a desperate fight between two factions of the streets of New Orleans. This determined the municipal authorities to break up the organization. In order to prevent this, the Mafia, in October of that year, murdered Hennessey, chief of police. Arrests were made, but owing to the secrecy and influence of the conspirators, the criminals after great delays were brought to trial before a jury which failed to convict. In March, 1891, six of the arrested men had escaped conviction by the jury, and ten were in jail with the prospect also of a similar escape from justice. Multitudes of the people were incensed over the results of the trial, and an indignation mass meeting was called, and after exciting speeches were made, an excited populace, under determined leaders, broke open the jail, and in defiance of all law, shot the Italian prisoners who had been charged with the assassination of chief Hennessey. This in brief is the incipient story of the "Mafia incident," which led to an exciting controversy between the Italian government and that of the United States.

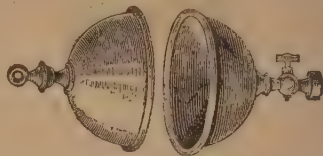
MAGADOXO, or **MUKDISHA**, a commercial town on the east coast of Africa, in the Somali country, in Lat. 2° 2' N. It belongs to the Imaum of Muscat. The town is divided into two parts; one composed wholly of tombs, the other comprising about 150 houses, a mosque, and several minarets of Arabian architecture. The exports are dhurra, beans, peas, cattle, cotton, spices, etc.

* A letter in an old English magazine tells the following story of the origin of the Mafia organization:

The "Mafia" society is over six hundred years old, having its origin at the revolt of Palermo which took place during an Easter carnival in the suburbs of that city in the year 1289. A beautiful young girl and her betrothed, in accordance with the quaint and primitive custom of that people, approached the Church of the Holy Ghost to be united in marriage at its altar; and while the lover sought the venerable padre in the little room at the rear of the building, his bride paused upon its threshold. As she stood, expectant-graceful as a fawn, fair as a dream, her innocent heart throbbing with the joy of her happiness—a drunken sergeant of the French garrison, Druet by name, strode up behind her, threw his arm about her waist, and thrust a huge, brutal hand into her pure, snowy bosom. With a cry of horror and fear the poor child tore herself from his polluting grasp and turned to fly, but the heel of her dainty slipper caught in the coping of the stone pavement and she fell, striking her head against a sharp projection of the church cornice.

At that instant the returning lover's eyes fell upon his beautiful mistress—lying lifeless, her white brow gaped with its cruel wound, her long tresses dabbled with her blood. With the savage fury of a wild beast he threw himself upon Druet, bore him to the earth, and drove his stiletto to the wretch's heart crying "Morte alla Francia!" "Death to the French!" There was a moment, a pause of silence, and then that maddened cry became the roar of infuriated thousands. It swelled and deepened; it took more solemn meaning—it became nationalized—and then burst forth: "Morte alla Francia Italia anela!" "Death to the French is Italy's cry!" For

MAGDEBURG HEMISPHERES, an instrument invented by Otto von Guericke consisting of two hollow hemispheres, generally made of copper or brass, with their edges accurately fitted together, and one of them furnished with a stopcock. When the edges are rubbed over with grease, pressed tightly together, and the globe thus formed exhausted of air through the cock, the hemispheres, which fell asunder before exhaustion, are now pressed together with immense force.



MAGDEBURG HEMISPHERES.

MAGELLANIC CLOUDS, or **NUBECULÆ MAJOR AND MINOR**, two cloud-like masses of nebulous stars in the sky of the southern hemisphere. See *ASTRONOMY*, *Britannica*, Vol. II, p. 821.

MAGENDIE, **FRANÇOIS**, a French physiologist, born at Bordeaux, Oct. 15, 1783, died Oct. 7, 1855. He studied at Paris; in 1819 became a member of the Academy of Sciences; and in 1831 professor of anatomy in the Collège de France. He practiced vivisection extensively, and by this and other means of observation made important additions to knowledge of nerve-physiology, the veins, and the physiology of food. He was the author of *Éléments de Physiologie*; *Leçons sur les Phénomènes physiques de la Vie*; *Leçons sur les Fonctions et les Maladies du Système Nerveux*; and *Leçons sur le Sang*. He was also the founder, and for ten years the editor, of the *Journal de la Physiologie Expérimentale*.

MAGEROE, the most northerly of the larger European islands, belonging to Norway and lying close to the coast of Finmark, in the Arctic Ocean. It terminates, towards the North Cape, 950 feet in height. Mageroe is twenty-two miles in length, fifteen miles in breadth, and is deeply indented by bays. It supports a few Norwegian and Lappish families.

MAGILP, or **MEGILP**, a composition used by artists in oil-colors as a medium and for glazes. It is made of linseed-oil and mastic varnish.

MAGILUS, a remarkable gasteropod found on the coral reefs of warm eastern seas. The young animal settles on the growing coral at the obvious risk of being gradually surrounded and smothered. This is avoided, however, by an entire change in the form of the shell, which is diverted from its original spiral type and grows out into a long irregular tube. "A neck and neck race is kept up until the mollusk or the coral dies."

MAGINN, **WILLIAM**, an Irish author, born at Cork, Nov. 11, 1793, died at Walton-on-Thames, Aug. 21, 1842. He was educated at Trinity College, Dublin, where he won a brilliant reputation for precocious scholarship; taught in Cork for ten years; and in 1823 removed to London to pursue a

seventy-two hours armed bands, headed by the father and betrothed of the hapless girl, hunted down the hated French, and their search was as the quest of the tiger and bloodhound.

But retribution was to come after this carnival of blood, and in dread of the vengeance of the French nation these unhappy people formed themselves into secret organizations with its password and name of the society made up of the initial letters of the words which compose that fateful death cry, thus forming "Mafia." Its object was resistance to oppression, and as the lapse of years added to its power and influence it stretched forth its hands against the rich and mighty in behalf of the poor and the down-trodden. To-day it is but the hideous cloak of the creeping thug and the assassin of the night.

life of letters. His first contributions to "Blackwood's Magazine" appeared in 1819, and from that date for nine years scarcely a number appeared without an article from his pen. In 1824 Murray started the short-lived "Representative," a daily newspaper, and Maginn was sent to Paris to act as foreign correspondent. In 1828 he joined the staff of the "Standard," and was one of the originators of "Fraser's Magazine" in 1830. He also contributed numerous papers to the "Quarterly Review," to "Bentley's Miscellany," and to "Punch," and wrote two romances. His writings were characterized by learning and wit, but his habit of intemperance gained the mastery over him and rendered his career a failure. His critical and miscellaneous essays, *Homeric Ballads*, and *Shakespeare Papers* were collected in the United States and edited by Dr. R. S. Mackenzie (1855-'57).

MAGNIFICAT, the "Song of the Virgin Mary," which, in the Vulgate, begins with *Magnificat*.

MAGNUSEN, FINN, a Danish archaeologist, born at Skalholt, Iceland, in 1781, died at Copenhagen in 1847. After being educated at Copenhagen he became a lawyer in Iceland in 1803, but was in 1815 appointed as professor of northern antiquities and afterwards as keeper of the archives in Copenhagen. He prepared a dictionary of Scandinavian mythology and a full exposition of its system. But his chief work is a translation of the older *Edda* which he published with abundant commentaries in 1821-'23. All his writings indicate excellent judgment and extensive learning.

MAGRUDER, JOHN B., an American general, born in Virginia about 1810, died in Texas in 1871. He graduated at West Point, and won distinction in the Mexican war; he was wounded at the battle of Chapultepec. He entered the Confederate army in 1861, and served in the Yorktown and Chickahominy campaigns. He was put in command of the Western Department as major-general in 1862, and was distinguished as an able general.

MAHAFFY, JOHN PENTLAND, an Irish educator, born at Chafonaire, Switzerland, in 1839. After being educated in Germany and at Trinity College, Dublin, he was a tutor and lecturer at the latter college, and became a professor of ancient history there in 1869, and Donellan lecturer in theology for 1873-'74. He is a very able teacher, thorough scholar and has progressive ideas on education. His most meritorious writings are *Lectures on Primitive Civilization*; *Prolegomena to Ancient History*, which treats on Egyptian antiquities; *Greek Social Life from Homer to Menander*; *Rambles and Studies in Greece*; *History of Greek Classical Literature* (1880); and *Kant's Critical Philosophy for English Readers*.

MAHDI, EL, Arabic for "The Well Directed," the title of an Arab, whose proper name is supposed to have been Mohammed Ahmed, who was born near Dongola, Nubia, about 1842; became a monk or dervish, and in 1881 announced himself as the Mahdi or Messiah of the Mahomedan faith. After the overthrow of Arabi Pasha in Egypt, in 1882, the Mahdi raised a very large body of troops in the Sudan, with which he annihilated the Egyptian army under the command of Hicks Pasha. By 1884 he had extended his power to Suakim and the Red Sea, and threatened the frontiers of Egypt. The English, who had for purposes of their own adopted a protectorate over Egypt, found themselves threatened by an insurrection which at any cost had to be suppressed. They sent General CHARLES GORDON (q. v.), unarmed and alone, to Khartoum, who assumed command of the Egyptian troops at that point where the Mahdi speedily blockaded him. The history of the Khartoum expedition, with all its disasters, is told elsewhere, but finally, in Janu-

ary, 1885, Khartoum was captured, and Gordon slain. The British evacuated the entire territory, with the exception of Suakim, and the Mahdi formed a government with its capital at Khartoum. A few months later he died, it is said, of small-pox, and was succeeded by one of his generals, who still (1892) holds the country.

MAHONEY, WILLIAM, born in Virginia, Dec. 21, 1826; graduated at the Virginia Military Institution in 1847, and engaged in civil engineering. In 1861 he joined the Confederate army, took part in the capture of Norfolk navy yard, and engaged in nearly every battle of the Peninsular campaign, on the Rappahannock, and in the campaign around Petersburg. He won the reputation of a fearless fighter, became brigadier and major-general, and commanded a division in A. P. Hill's corps. After the war he returned to engineering and became president of the Norfolk and Tennessee railroad. He entered politics about 1878, and became the leader of the party which aimed at the "readjustment" (a mild equivalent for repudiation) of the State debt of Virginia. In 1880 he was elected United States Senator, and served from March, 1881, to 1887, but was defeated for reelection.

MAHANOY CITY, a borough of Pennsylvania, near the watershed between the Delaware and Susquehanna rivers. It has about 20 collieries, and an active trade with the other coal-mines in the neighborhood. Population in 1890, 11,291. See *Britannica*, Vol. XX, p. 285.

MAHIM, a town of the island of Bombay, 10 miles north of the city of Bombay. The town is ill-built and inhabited chiefly by Christians of Portuguese descent, who have here a church and some other relics of former prosperity. The inhabitants are chiefly employed in fishing, the place being famous for its oysters. Population, 9,000.

MAHONY, FRANCIS, better known by his famous pen-name, "Father Prout," was born at Cork in 1805, and educated for the priesthood at a Jesuit college in Paris, and subsequently in Rome, where he remained for seven years and received ordination. He abandoned the clerical calling about 1834 and joined the staff of "Fraser's Magazine," his contributions to which were republished under the title of *Reliques Father Prout* in 1836. He contributed also to "Bentley's Magazine" from 1837. For some years he acted as Roman correspondent to the "Daily News," and his letters were collected and published in 1847 as *Facts and Figures from Italy*, by Don Jeremy Savonarola, *Benedictine Monk*. During the last years of his life he lived in Paris, and was correspondent to the "Globe" newspaper, till, in 1864, he retired to a monastery, where he remained till his death, May 19, 1866.

MAIGRE (*Sciæna aquila*), a fish of the acanthopterous family *Sciænidæ*, common in the Mediterranean. It attains a large size, and much resembles a large bass.

MAILED CHEEKS (*Sclerogenidæ* or *Triglidæ*), a family of acanthopterous fishes, characterized by an extension of certain sub-orbital bones to the gill-covers to form a bony armor for the cheeks. The species are widely distributed in the seas of all parts of the world.

MAIMATCHIN, a Chinese trading town on the northern boundary of Mongolia, opposite Kiachta, from which it is separated by a narrow strip of neutral territory. Population, 3,000.

MAINE, SIR HENRY SUMNER, an English jurist, born in 1822. After graduating at Pembroke College, Cambridge, he became professor of civil law there, and was afterwards reader on jurisprudence at the Middle Temple, London, until 1862. In 1870 he was professor of jurisprudence at Oxford Uni-

versity, and since 1877 he has been master of Trinity Hall, Cambridge. His most important works are *Ancient Law, Its Connection with the Early History of Society; Village Communities in the East and West, and Early History of Institutions* (1875). He has proved the inaccuracy of the theories which had long prevailed in regard to the institutions of civilized society. He died in 1888.

MAINE LAW, a law passed by the legislature of the State of Maine, in 1851, prohibiting in that State, in stringent terms, the sale of intoxicating liquors as a beverage.

MAINE, STATE OF. For general article on the State of Maine, see *Britannica*, Vol. XV, pp. 297-302. The census reports of 1890 record the revised figures showing the area and population as follows: Area, 33,040; population, 661,086, a net gain during the last decade of 12,150, or 1.87 per cent. Capital, Augusta, with a population of 10,521. The total area here given includes 29,895 square miles of land area and 13,145 of water area.

The population of other cities and towns of the state which had each 8,000 inhabitants or over were as follows:

Cities.	1890.	1880.	Increase.	Per Cent.
Auburn	11,250	9,555	1,695	17.74
Bangor	19,103	16,856	2,247	13.33
Bath	8,723	7,874	849	10.78
Belfast	6,294	5,808	*14	*0.26
Biddeford	14,443	12,651	1,791	14.16
Lewiston	21,701	19,081	2,618	13.72
Portland	38,425	33,810	4,615	7.73
Rockland	8,174	7,599	575	7.57

* Decrease.

The land areas and populations of the several counties of the State were returned in the census of 1890 as follows—the areas being given in square miles:

Counties.	Area.	Population.	
		1890.	1880.
Androscoggin	485	48,968	45,042
Aroostook	6,700	49,589	41,700
Cumberland	1,005	90,949	86,359
Franklin	1,660	17,053	18,180
Hancock	1,812	37,312	38,129
Kennebec	888	57,012	53,058
Knox	326	31,473	32,863
Lincoln	520	21,996	24,821
Oxford	1,892	30,586	32,627
Penobscot	3,332	72,865	70,476
Piscataquis	3,722	16,134	14,372
Sagadahoc	260	19,452	19,272
Somerset	3,664	32,627	32,333
Waldo	705	27,759	32,463
Washington	2,452	44,482	44,484
York	920	62,829	62,257

The column of county areas above gives the land areas only.

The following is a full list of the governors of the State of Maine from the beginning, with their dates of service severally:

William King	1820-21	Samuel P. Merrill	1855-56
W. D. Williamson	1821-22	Samuel Wells	1856-57
Albion K. Parris	1822-27	H. Hamlin	1857
Enoch Lincoln	1827-29	Joseph H. Williams	1857-58

Nathan Cutler	1829-30	Lot M. Morrill	1858-61
Jonathan D. Hinton	1830-31	Israel Washburn	1861-63
Samuel B. Smith	1831-34	Abner Coburn	1863-64
Robert P. Dunlap	1834-38	Samuel Corbridge	1864-67
Edward Kent	1838-39	J. L. Chamberlain	1867-71
John Fairfield	1839-40	Sydney Perham	1871-74
Edward Kent	1840-41	Nelson Dingley, Jr.	1874-76
John Fairfield	1841-43	Seldon Connor	1876-79
Edward Kavanagh	1843-44	Alonzo Garcelon	1879-80
Hugh J. Anderson	1844-47	Daniel F. Davis	1880-81
John W. Dana	1847-50	Harriet M. Halsted	1881-83
John Hubbard	1850-53	Frederick Rolfe	1883-87
W. G. Crosby	1853-55	Joseph B. Bodwell	1887-89
Edwin C. Burleigh	1889-93.		

The governor's term of office is for two years; salary \$2,000. Governor Burleigh was reelected for the term beginning Jan. 1, 1891.

ABBREVIATED HISTORIC RECORD.—The territory of Maine was first discovered by Norsemen in 990, and re-discovered by Sebastian Cabot in 1497. It is believed, however, that the coast was not visited until the French expedition under Verazzano in 1524. The first settlement was made in 1604 by the French under DuMont. In 1605 the coast near the river St. George was visited by Capt. Weymouth, and this resulted in the expedition to the mouth of the Kennebec River in 1607. In 1616 Capt. John Smith took possession of Monhegan Island. In 1620 James I. of England granted to the Plymouth Colony the whole country from the 40th to 48th degree of north latitude. In 1622 Capt. John Mason and Gorges obtained from the Plymouth Colony a grant of the territory between the Kennebec and Merrimac rivers, and a year later planted a colony at the mouth of the Piscataqua. Most of the settlements were destroyed by the Indian war of 1675. The French claimed the territory east of the Penobscot River until after the Revolution of 1775. The province between the Kennebec and Penobscot rivers was granted by Charles II. to his brother James, the Duke of York (afterwards James II.), in 1664, and the whole country was surrendered to Massachusetts in 1689; but the latter relinquished Nova Scotia, and the rest was secured to her by the treaty of 1783, and thence forward she retained jurisdiction over it as "the district of Maine." By act of Congress approved March 3, 1820, Maine was admitted (March 15 of the same year) as a State into the Union. The "Maine Boundary Question," long pending between Great Britain and the United States, was finally settled by the Ashburton treaty concluded Aug. 9, 1842.

For numerous other items of interest relating to the State of Maine, see the article **UNITED STATES** in these Revisions and Additions.

Progress of the State in population by decades: In 1790, 96,540; 1800, 151,719; 1810, 225,705; 1820, 298,269; 1830, 390,455; 1840, 501,793; 1850, 583,169; 1860, 628,279; 1870, 626,915; 1880, 648,936; 1890, 661,086.

MAINTENANCE, CAP OF, sometimes called **CAP OF DIGNITY** and **CAP OF ESTATE**, a cap of crimson velvet lined with ermine, with two points turned to the back, originally in heraldry, belonging to nobles exclusively, but afterward assigned to various families of distinction. Those families who are entitled to a cap of maintenance place their crests on it instead of on a wreath. Also a cap of state carried before sovereigns of England at their coronation, and before the mayors of certain cities on special occasions.

MAIZE, INDIAN CORN. See **CORN** in these Revisions and Additions.

MAKART, HANS, an Austrian painter, born at Salzburg, in 1840, died at Vienna, in 1884. He studied under Piloty, at Munich. Afterwards he became professor of painting in the Vienna academy. In 1876 his large picture of *Venue Doing Homage to Catharine Cornaro* was exhibited at the

centennial exhibition in Philadelphia. It is now in the Berlin national gallery. Among his other works are *Roman Ruins*; *The Plague at Florence*; *Cleopatra*, and *Entrance of Charles V. into Antwerp*. He also painted many scenes from Shakespeare. All his large canvases are brilliant in coloring, but often too crowded; and some of his themes are sensuous.

MAKEMIE, FRANCIS, an American clergyman, died in 1708. He was licensed to preach in 1681, and subsequently engaged in trade with the West Indies. In 1699 he returned to preaching and traveled through many of the colonies, delivering sermons wherever he could find an audience. He wrote *Catechism* (1691); *An Answer to George Keith's Libel* (1692); *Truth in a New Light* (1699); *A Plain and Loving Persuasive to the Inhabitants of Indiana and Virginia*, etc. (1704), and a *Letter to Lord Cornbury* (1707).

MALACHI. See *Britannica*, Vol. XV, p. 313.

MALACOLOGY (Gr. *Malakos*, "soft"), a name sometimes employed to designate that branch of natural history which has mollusks for its subject.

MALAN, CÉSAR HENRY ABRAHAM, a Swiss clergyman, born at Geneva, in 1787, died there in 1864. While studying theology at Geneva, he was a rationalist; but in 1817 he became an Evangelical Trinitarian. He held Calvinistic views that were not tolerated at the time, and he was therefore excluded from that pulpits. Malan was a man of a deeply spiritual nature. He made missionary tours in various Protestant countries and produced remarkable revivals. His hymns *Les Chants de Lion*, with music, were very popular. His works, *The Church of Rome*; *Stories for Children*, and *Pictures From Switzerland* have been translated into English.

MALAN, SOLOMAN CÉSAR, an English clergyman, son of the preceding, born at Geneva, in 1812. He graduated at St. Edmund's Hall, Oxford, went to Calcutta as classical professor in Bishop's College in 1838, and took orders in the church of England. After his return to England he became vicar of Broadwindsor, Dorsetshire, in 1845, and was made prebendary at Sarum in 1870. Malan has written many works on ecclesiastical subjects, British birds, travels, etc., and has translated many books from Russian, Chinese, Ethiopic, and other languages. He understands many languages and is considered the greatest polyglot scholar now living.

MALARIA, SWAMP-FEVER. See *Britannica*, Vol. XV, pp. 316-320.

MALCOM, HOWARD (1799-1879), an American Baptist clergyman. He held pastorates in Hudson, N. Y., and Boston, Mass., and from 1839 to 1849, was president of the college in Georgetown, Ky. From 1851 to 1858, he was president of the University of Lewisburg, Pa., and from 1874 to 1879, of Hahnemann medical college, Philadelphia. He published *Dictionary of the Bible* (1828); *Nature and Extent of the Atonement* (1829); *Christian Rule of Marriage* (1830); *Travels in Southeastern Asia* (1839), and an *Index to Religious Literature* (1869).

MALDEGHEM, a town of East Flanders, Belgium, twelve miles by rail east of Bruges. Population, 8,522.

MALDEN, a city of Massachusetts. Containing the villages of Linden and Maplewood. Population in 1890, 22,984. See *Britannica*, Vol. XV, p. 327.

MALIBRAN, MARIA FELICITA (1808-1836), one of the most celebrated mezzo-soprano singers of recent times, born at Paris, March 24, 1808, the daughter of Manuel Garcia, a Spanish singer and teacher of singing. When she was still very young, her reputation extended over Europe. Her father attempted to establish the Italian opera in New

York, but without success. She married M. Malibran, a Frenchman, who soon became bankrupt, and she went again upon the stage, and was received with great enthusiasm in France, England, Germany and Italy. Her first marriage having been dissolved, she married M. Beriot, a famous violinist, in 1836; but, in September of that year, she died at Manchester, whither she had gone to take part in a musical festival. She was a woman of noble heart and high intellect, and her conversation possessed an exquisite fascination.

MALINGERING, feigning disease in order to escape duty or to excite pity. As defined in the English army act of 1881, it implies some overt act, such as the previous application of a ligature, or the taking of some drug, which produces the appearance of the disease said to exist.

MALLOCH, WILLIAM HURRELL, an English author, born in Devonshire, in 1849. He is a nephew of J. A. Froude. At Oxford he obtained a prize for an English poem in 1871. He wrote *Every Man his Own Poet*, and *New Republic* (1876). The last is a dialogue in which representative English persons are brought forward in a very realistic way. It established his reputation as a satirist. Then followed his *New Paul and Virginie*, or *Positivism on an Island* (1878). He excited still further sensation by his essay *Is Life Worth Living*, which is a forcible statement of pessimism.

MALLORY, STEPHEN RUSSELL (1813-1873), an American statesman. In 1839 he was admitted to the Florida bar and became judge of probate, and in 1845 was appointed collector of customs at Key West. In 1851 he was chosen to the United States Senate, and continued to represent his State until 1861, when he resigned to take part with the southern States. He was then appointed by Jefferson Davis secretary of the navy, and held the post during the war. From 1866 until his death he practiced law at Pensacola, Fla.

MALMESBURY, JAMES HOWARD HARRIS, THIRD EARL OF, born in London, March 25, 1807, died May 7, 1889. He was educated at Eton and at Oriel College, Oxford, graduating in 1827. In 1837 he stood as a Tory for Portsmouth, and in 1841 had just been returned for Wilton, when his father's death called him to the House of Lords. He was foreign secretary under Lord Derby in 1852, and again in 1858-59; and was lord privy seal in 1866-68, and again in 1874-76. In 1884 appeared his *Memoirs of an Ex-Minister*.

MALONE, a post-village, the county-seat of Franklin county, N. Y., on Salmon River, sixty miles from Ogdensburg. It is the center of a large agricultural trade and carries on several manufactures.

MALTA. For general article on MALTA, see *Britannica*, Vol. XV, pp. 339-43. The latest figures place the area at 95 square miles, and that of the neighboring island, Gozo, 20, making a total of 115 square miles. Population in 1888, 162,423. Chief town and port, Valetta. In 1888 there were a university, a lyceum, and two secondary schools. The governor is appointed by Great Britain; salary \$25,000. Revenue in 1888, 240,156; expenditures, 212,313; chief sources of income: Customs, 156,600; land-tax, 14,957; rents, 22,744; postage, 9,710; interest, 9,163; licenses, 3,915. Branches of expenditure: Establishments, 90,477; services, etc., 121,836.

MALTESE CROSS, a cross of eight points, of the form worn as a decoration by the Hospitalers and other orders of knighthood.

MAURITIUS. For general article, see *Britannica*, Vol. XV, pp. 639-42. The latest reliable reports place the area of Mauritius and its depend-

encies at 705 square miles. Population in 1890, 372,664.

The government of the British colony of Mauritius, with its dependencies, Rodrigues, Diego, Garcia, and the Seychelles Islands, is vested in a governor, aided by an executive council, of which the officer in command of her majesty's troops, the colonial-secretary, the procureur-general, the receiver-general, and the auditor-general, and two elected members of the council of government are ex-officio members. There is also a council of government, consisting of the governor and twenty-seven members, ten being elected, eight ex-officio, and nine nominated by the governor. The official councillors comprise the five executive members, the collector of customs, the protector of immigrants, and the surveyor-general. The constitution was altered by letters-patent dated Sept. 16, 1885, which introduced an elective element into the legislature. Under a moderate franchise ten members are now elected, one for each of the following districts:—Moka, Plaines Wilhems, Grand Port, Flacq, Savanne, Rivière Noire, Pamplemousses, Rivière du Rempart, and two for Port Louis.

The governor receives a salary of 50,000 (Indian) rupees, and the colonial secretary a salary of 13,500 rupees.

MALURUS, a genus of Australian birds, having generally a long tail. It gives its name to a large subdivision of the family *Sylviidae*, in which are contained many Asiatic and African species, and some that are natives of the south of Europe. One of the most noted *Maluri* is *M. cyaneus*, the blue wren or superb warbler of Australia, gorgeously attired in black, blue, white, and brown.

MAMELI, GOFARDO, an Italian patriot and poet, author of the stirring national hymn "Fratelli d'Italia," born at Genoa in 1826, died fighting against the French upon the walls of Rome in 1849. Mazzini, his most tender admirer, said of the young hero: "Mameli was beautiful and graceful in person, of a very fair and ruddy complexion, with hair inclining to blonde. His eyes were flashing and full of command, and his expression, naturally sweet, became stern and determined whenever his mind was resolutely bent to accomplish an object."

MAMIANI DELLA ROVERE, COUNT TERENCE, an Italian scholar and statesman, born in 1799 at Pesaro, in the Romagna, died at Rome, May 21, 1885. He took a prominent part in the futile outbreak at the accession of Gregory XVI., and was compelled to flee to Paris, whence he returned to Rome in 1848 after the unconditional amnesty of Pius IX., and actually held office for three months in the papal ministry. He next withdrew to Turin, where he founded his society for promoting Italian unity. On the flight of Pius IX. from Rome to Gaeta he re-entered the political arena, and was for a short period foreign minister in the cabinet of Galetti. On the fall of Rome he retired to Genoa; in 1856 he was member of the Sardinian parliament, and in 1860 entered Cavour's ministry as minister of instruction. He was appointed ambassador to Greece in 1861, to Switzerland in 1865.

MAMMEE APPLE (*Mammea Americana*), a highly esteemed fruit of the West Indies and of tropical America, produced by a beautiful tree, 60 to 70 feet high, of the natural order *Guttifera*. The fruit is roundish, from the size of a hen's egg to that of a small melon, with a leathery rind, and a delicate bitter inner rind adhering closely to the yellow pulp. A similar fruit is produced by *Mammea Africana*, an African species.

MANATIDÆ, a family of *Cetacea*, including all the herbivorous section of the order. It has been

supposed that some of the stories of mermaids may have originated in the females of some of the *Manatidæ* being seen with the head and breasts raised out of the water. There are several genera of *Manatidæ* described in the articles Dugong and MANATEE.

MANBY, GEORGE WILLIAM, inventor of life-saving apparatus for shipwrecked persons, born in 1765, at Hilgay, England, died Nov. 18, 1854. He served in the militia, and became barrack-master at Yarmouth in 1803. In 1808 he succeeded, with apparatus designed by him, in saving the lives of the crew of the brig "Elizabeth." A career of usefulness was thus commenced, which he followed for the remaining forty-six years of his life. It was estimated that, by the time of his death, nearly 1,000 persons had been rescued from stranded ships by means of his apparatus.

MANCHESTER, a post-village, one of the county-seats of Bennington county, Vt. It contains Burr and Barton Seminary, a classical school, and is a pleasant summer resort.

MANCHESTER, a post-town of Chesterfield county, Va., on the south bank of James River, opposite Richmond. It is a manufacturing town. Population, 9,229.

MANCHESTER, a post-village of Delaware county, Ia., on the west branch of the Maquoketa River, forty-seven miles west of Dubuque. Farming is the chief business.

MANCHESTER, a post-village and railroad junction of Washtenaw county, Mich., fifty-five miles west of Detroit. It has medicinal springs, a brewery, foundry, saw and planing mills.

MANCHESTER, the largest city of New Hampshire, and one of the greatest manufacturing centers of New England. The Merrimac River falls here 54 feet (Amoskeag Falls), and supplies ample water-power for driving a number of mill and machine works. In the value of its cotton and woolen fabrics Manchester ranks the fourth city in the United States. Population in 1870, 23,536; in 1880, 32,630; in 1890, 43,983. See Britannica, Vol. XV, p. 465.

MANCHESTER, a post-village of Adams county, Ohio, on the north bank of the Ohio River. It is a shipping point for farm produce, and has manufacturing of furniture.

MANCHINEEL (*Hippomane Mancinella*), a tropical American tree of the natural order *Euphorbiaceæ*, celebrated for the poisonous properties of its acrid milky juice. The Indians of tropical America use it for poisoning their arrows. The fruit is not unlike a small apple, and the wood is well suited for cabinet-making.

MANCINI, PASQUALE, an Italian statesman, born at Naples in 1820. After graduating in his native city he became professor of jurisprudence there. As a member of the Neapolitan parliament he opposed the king and had in 1848 to flee to Turin, where he became professor of international law. In 1860 he became minister of justice and religion in the new Italian government. He was a leader of the liberal party in the first Italian parliament in 1861, and in the next year he was also minister of education. Mancini resides at Rome where he is professor in the university as well as deputy in parliament. He has published *Diritto Internazionale* (1873). His wife LAURA BEATRICE OLIVA MANCINI (1723-1869) was a noted poetess. Many of her poems had reference to the political condition of Italy.

MANDAN, a thriving town, the county-seat of Morton county, N. Dak., about five miles west of Bismarck. It is the seat of the State Reform School.

MANDANS, a small tribe of North American Indians, living now on a reservation on the Yellowstone River, in northwestern North Dakota and eastern Montana. Being of light complexion they have acquired the name of the "White Indians." They live by agriculture, and are peaceful and friendly, but have made no great steps towards civilization. See INDIANS, NORTH AMERICAN, in these Revisions and Additions.

MANDARA, or WANDALA, an African kingdom, capital Doloo, with a population of 30,000 Mohammedan negroes.

MANDAYEE, or MANDIVEE, the principal seaport town of Cutch, India, on the Gulf of Cutch, about 35 miles from Bhooj, or Bhuj. It is fortified, has an open roadstead and an active trade with Sindh, Malabar, the Persian Gulf, Arabia, and the west coast of Africa as far as Zanzibar, besides a large inland trade. Its exports comprise cotton, silk and other piece-goods. Its imports are bullion, ivory, hides, dates, cocoa-nuts, grain and timber. Population, 50,000.

MANGAN, JAMES CLARENCE, a gifted Irish poet, born in 1803, died at Meath Hospital, Dublin, June 20, 1849. He was for many years employed in copying in an attorney's office. His heart was framed

for suffering, and his whole life was a tragedy of hapless love, poverty and intemperance, until he found rest in death. There is fine quality in his original verse, as well as in his translations from the German, but more especially from the old Irish, as in the impassioned ballad of *Dark Rosaleen*. His *German Anthology* was published in two volumes in 1845, and a complete edition of his poems at New York in 1870, with a biographical introduction by John Mitchel.

MANGANESE. Besides the black and brown oxides of manganese the "bog manganese" has recently become an article of commerce in the United States. It is found in earthy or kidney-like masses. The bog ore is the common one from Maine to Pennsylvania; whereas from Maryland to Georgia the black ore is the most common one. The latter is mined at the Crimora mine of Augusta county, Va., and the mines of Barton county, Ga. Deposits on Red Rock Island, in San Francisco Bay, are also worked. About 75 per cent. of all the native manganese ore comes from the Crimora mine.

PRODUCTION OF MANGANESE ORES IN THE UNITED STATES SINCE 1880.—The production of manganese from 1880 to 1889, inclusive, was as follows:

States.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Total	5,761	4,895	4,532	6,155	10,180	23,258	30,198	34,524	29,198	23,927
Virginia.....	3,661	3,295	2,982	5,355	8,980	18,745	20,567	19,835	17,646	14,616
Arkansas.....		100	175	400	800	1,483	3,316	5,651	4,312	2,528
Georgia.....	1,800	1,200	1,000			2,590	6,041	9,024	5,568	5,208
Other States.....	300	300	375	400	400	450	269	14	1,672	1,575

This table shows the production of what may be strictly regarded as manganese ores. It has been impossible in some cases to separate the manganese and manganiferous ores which are the product of a given mine, but where the total production of a State averages more than 44.25 per cent. of metallic manganese its production is regarded as manganese ores.

PRODUCTION OF MANGANESE ORES IN 1889.—In the following table will be found a complete statement

of the production of manganese ores in the United States in 1889; also a statement as to its total value, the average value per ton, the number of employes engaged in mining, total wages of such employes, and total capital for all the States in which manganese ore was mined, except Vermont and Virginia:

The black oxide from Nova Scotia is very valuable for glass-making, because it contains very little iron. It neutralizes the green tint which iron

States.	Production.	Total value.	Value per ton.	Employés.	Wages.	Capital.
Total.....	23,927	\$238,989	\$9.99	433	\$123,858	\$2,094,475
Arkansas.....	2,528	23,173	9.17	96	33,191	1,200,000
California.....	901	17,000	17.00	10	1,149	2,400
Georgia.....	5,208	50,143	9.63	117	19,486	176,125
Nevada.....	15	83	5.53	2	60	200
North Carolina.....	17	170	10.00	2	60	250
South Carolina.....	124	744	6.00	6	400	5,000
Tennessee.....	30	120	4.00	3	70	100
Vermont.....	1,336	7,348	5.50	25	3,510	(*)
Virginia.....	14,616	156,257	10.69	171	65,939	711,000

* Included in Virginia.

gives to glass. Besides as a source for oxygen manganese is now mostly used as an alloy combined with steel (manganese steel), also with copper for brass and bronze, which are rendered much harder and denser by the addition of manganese. See *Britannica*, Vol. XX, pp. 479-481.

MANGIE, a contagious disease of the skin in horses, dogs, and cattle, similar to itch in the human subject. It results from the attacks of min-

ute mites or acari, animal or vegetable parasites, some burrowing in the skin, others moving upon it, causing much irritation and the eruption of minute pimples. The symptoms and treatment are fully described in *Britannica*, Vol. XXIV, p. 206.

MANGNALL, RICHMAL, of Irish extraction, but born in London, was the head-mistress of a ladies' school near Wakefield, and died in 1823. Few particulars of her personal history have been pre-

served; she survives only in her redoubtable Questions, the pride and terror of several generations of school-girls. She was an amiable and excellent woman, but as a writer she has been well called "the very high-priestess of the great god Cram." Of the popularity of her schoolroom encyclopædia, compiled entirely by herself, there can, however, be no doubt; an impression, printed in 1857 in America, was taken from the 84th London edition. It has been reprinted in England and the United States as recently as 1886.

MANHATTAN, a railroad center, a city and the county-seat of Riley county, Kan., situated at the junction of the Big Blue and Kansas rivers. It has manufactories of boots, shoes, carriages, wagons and cigars. The Kansas State Agricultural College is located here. Population, 2,972.

MANHEIM, a post-borough of Lancaster county, Pa., ten miles northwest of Lancaster, on the Reading & Columbia Railroad. It has manufactories of flour, carriages, cigars, and lumber.

MANIFESTO, a public declaration, issued usually by a sovereign, a prince, or a government on some state emergency, expressive of intentions, opinions, or motives.

MANISTEE, a city of Michigan, the terminus of a branch of the Flint Père Marquette Railway. It has several foundries, ten salt-works, and a large number of lumber-mills. Population in 1890, 12,799. See *Britannica*, Vol. XV, p. 490.

MANITOWOC, a city of Wisconsin. Population in 1890, 7,525. See *Britannica*, Vol. XV, p. 491.

MANKATO, a city of Minnesota. Three lines of railway pass here, and small steamboats can ascend the Minnesota River as far as this point. Population, 8,805. See *Britannica*, Vol. XV, p. 491.

MANLINS, a post-village of Onondaga county, N. Y., about twelve miles east of Syracuse. It is the seat of St. John's Military School, and contains manufactories of paper, iron, flour, woolen goods and cement.

MANLY, BASIL (1798-1868), an American Baptist clergyman. He was ordained in 1822, and then was pastor of churches in Edgefield Court House and Charleston, S. C. From 1837 to 1855 he was president of the University of Alabama and then engaged in missionary travels throughout Alabama. He wrote *The Baptist Psalmody* (1850).

MANNERS, JOHN JAMES ROBERT, an English statesman, second son of the fifth Duke of Rutland, born at Belvoir Castle, near Grantham, Leicestershire, in 1818. He took part in the movement for reviving the chivalric spirit of the Middle Ages. In furtherance of this object he published a volume of poems called *England's Trust* (1841), in which the famous couplet occurs:

"Let wealth and commerce, law and learning die,
But leave us still our old nobility."

It expresses the aims of that movement, the advocates of which were known as "Young England." In parliament he opposed the repeal of the Corn Laws and identified himself with the Conservatives. Under Lord Derby's administration he was first commissioner of works, and under Disraeli he was postmaster-general. Manners published a *Plea for National Holidays*; *Notes of an Irish Tour*; *Notes of a Cruise in Scotch Waters* in 1848; and *English Ballads and Other Poems*.

MANNING, HENRY EDWARD, an English cardinal, born at Totteridge, Hertfordshire, in 1808. After graduating as double first he was in 1834 appointed rector of Lavington and Graffham in Sussex, and in 1840 he was made arch-deacon of Chichester. In 1851 he left the Church of England and joined the Roman Catholic Church. After study-

ing for some years in Rome he was ordained priest in 1857, and founded the congregation of the Oblates of St. Charles Borromeo, at Bayswater, London. On the death of Cardinal Wiseman in 1865 he was appointed archbishop of Westminster. Being a zealous supporter of the papal infallibility, Dr. Manning was made a cardinal in 1875. He is the foremost spirit in all Catholic movements in England, has organized many parochial schools, promotes temperance, started many benevolent societies among the poor, and takes a lively interest in all practical reforms. He wrote *The Temporal Power of the Pope; England and Christendom; Petri Privilegium; and The Internal Mission of the Holy Ghost* (1875), besides many sermons and pamphlets.

MANNING, JAMES (1738-1791), an American clergyman. In 1763 he was ordained to the Baptist ministry, and in 1765 became president of Rhode Island College (now Brown University). He held this position until his death, and from 1771 was also pastor of the First Baptist Church in Providence.

MANRENT, or MANRED, BONDS OF, agreements which used to be entered into in the Highlands of Scotland between the greater and lesser magnates, where protection on the one hand was stipulated in return for allegiance on the other; vassalage.

MANSARD, or MANSART, FRANÇOIS, a distinguished French architect, born at Paris in 1598, died in 1662. He initiated the peculiar roof known by his name.

This roof (Mansard) is constructed with a break in the slope, so that each side has two planes, the lower being steeper than the upper. The framework ought to be so arranged that its parts shall be in equilibrium. This kind of roof has the advantage over the common form of giving more space in the roof for living room.

MANSION HOUSE, the official residence of the Lord Mayor of London, built on the site of the Old Stocks Market in 1739, at a cost of about \$215,000. It is an oblong building, and at its farthest end is the Egyptian Hall. Four hundred guests can dine in this grand banqueting-room, which was designed from the description of an Egyptian chamber given by Vitruvius. All the great banquets, public and private, given by the Lord Mayor take place here, and there are also fine ball and reception rooms. At the close of exhibition of 1851 the Corporation of London voted \$50,000 to be expended on statuary for the adornment of the Mansion House; and there is also a fine gallery of portraits and other pictures. Among its curiosities may be mentioned a state bed which cost \$15,000, and a kitchen and culinary utensils extraordinary for their vast size. The Mansion House is often a centre of benevolent enterprise in the collection of money for sufferers by war, famine, flood, pestilence, and earthquake abroad, or by colliery explosions, shipwrecks, and lack of employment at home; and Mansion House Funds are also raised for memorials to heroic worth.

MANSFIELD, a post-village and a railroad junction of Bristol county, Mass., where cutlery, baskets, gold, shell and horn jewelry are manufactured. The town also contains foundries, spindle-works, and straw-works.

MANSFIELD, a city of Ohio. Population in 1890, 13,542. See *Britannica*, Vol. XV, p. 498.

MANSFIELD, a post-borough of Tioga county, Pa., on the Tioga River. It has a State normal school, school for soldiers' orphans, a planing-mill, a bedstead factory, and an iron furnace.

MANSFIELD, EDWARD DEERING (1801-1880), an American author. In 1825 he was admitted to the

Connecticut bar, and in 1855 became professor of constitutional law in Cincinnati (Ohio) College. From 1836 to 1849 he was editor of the "Cincinnati Chronicle," from 1849 to 1852 of the "Atlas," and from 1854 to 1872 of the "Railroad Record." He published *A Discourse on the Utility of Mathematics* (1835); *A Treatise on Constitutional Law* (1835); *A Political Grammar of the United States* (1835); *The Legal Rights, Duties, and Liabilities of Married Women* (1845); *The Life of Gen. Winfield Scott* (1848); *The History of the Mexican War* (1849); *American Education* (1851); *The Memoirs of Daniel Drake* (1855); and *A Popular Life of Gen. Ulysses S. Grant* (1868).

MANSFIELD, JARED (1759-1830), an American mathematician. From 1777 to 1802 he taught in New Haven, and Philadelphia, and then entered the army as captain of engineers. In 1805 he was made major, and in 1808 lieutenant-colonel. From 1803 to 1812 he was United States surveyor of Ohio and the Northwest Territory, and then till 1828 was professor of experimental and natural philosophy in the United States military academy. He wrote *Essays, Mathematical and Physical* (1802).

MANSFIELD, JOSEPH KING FENNO (1803-1862), an American soldier. He entered the army in 1822, and was assigned to the engineer corps. In 1832 he became 1st lieutenant, and in 1838 captain. He took part in the Mexican war, and received the brevet of colonel for meritorious conduct. In 1853 he was appointed inspector-general of the United States army, and in 1861 was placed in command of the department of Washington. Later he was assigned to Suffolk, Va., where he acted as military governor. At the battle of Antietam he was mortally wounded. He had previously been promoted major-general of volunteers.

MANT, RICHARD, an English prelate, born at Southampton in 1776, died at Ballymony, Ireland, in 1848. He was educated at Oxford, and, after holding curates at Southampton and London, he became successively bishop of Killaloe (1820) and of Down and Connor (1828). He is best known by an *Annotated Bible*, which he prepared in partnership with George D'Oyly; an *Annotated Book of Common Prayer*; and a *History of the Church of Ireland*, which he published in 1839-41. His metrical version of the *Book of Psalms*, and *Ancient Hymns of the Roman Breviary* have considerable merit.

MANTES, a town in the French department of Seine-et-Oise, on the left bank of the Seine, thirty-six miles from Paris. It has a fine tower (1344) and a Gothic church, a reduced copy of Notre Dame at Paris. Mantes in 1083 was burned by William the Conqueror, who here received the injury that caused his death. Population, 6,607.

MANTEUFFEL, EDWIN HANS KARL, FREIHERR VON, a Prussian general and administrator, born at Dresden, Feb. 24, 1809, died at Carlsbad, June 17, 1885. Entering the Prussian guards in 1827, he rose to be colonel by 1854, and three years later was nominated head of the military bureau at Berlin, a post which he held until 1865. Having been appointed commander of the Prussian troops in Sleswick, he protested against the summoning of the Holstein estates by marching his men into that duchy. On the outbreak of hostilities Manteuffel commanded a division of the army of the Main, which was destined to act against the south German allies of Austria. He took part in the battle of Langensalza, which brought about the capitulation of the Hanover army, and on the 19th of July succeeded Von Falckenstein as commander-in-chief of the Main army, and by winning the battles of Werbach, Taubenbischsheim, Hemstätt, and Rosbrunn over the Bavarians and others, he

brought that part of the campaign to a successful issue. He entered the war of 1870 as commander of the first corps, but was soon promoted to the command of the first army, which fought successfully at Amiens and other places. Transferred in January, 1871, to the command of the army of the south, operating against Bourbaki, Manteuffel assailed the enemy's rear near Belfort, and drove 80,000 men across the frontier into Switzerland. When peace was proclaimed he was placed at the head of the army of occupation in France, and in 1879 was appointed imperial viceroy of the newly-organized provinces, Alsace-Lorraine.

MANTI, a city, the county-seat of San Pete county, Utah, situated near the center of the State, twenty-three miles southeast of Nephi, in a beautiful and fertile valley.

MANTIGER, MANTICHOBA or MANTEGRE, a fabulous monster with the body of a beast of prey and a human head.

MANTLET, a shield or screen to protect the men working guns in embrasures, casements or port-holes from the bullets of sharpshooters, or to protect besiegers in making attacks.

MAN-TRAPS, engines for the terrifying of trespassers and poachers (formerly often indicated by the warning notice "man-traps and spring-guns set here"), resembled gigantic rat-traps 4 feet long.

MANURES. See Britannica, Vol. XV, pp. 505-512.

MAPLE, a tree, the best known species of which is the sugar-maple (*Acer saccharinum*). It is most abundant in the New England States, and Canada. Together with the beech it forms sometimes whole forests. The extraction of the sap does not injure the trees. They yield for many years. To obtain the sap the tree is tapped in February, March, or April, according to the locality and the season. Frosty nights followed by warm days favor the flow of the sap. An incision is made in the trunk with an auger or axe, at first $\frac{1}{2}$ -inch deep, and is increased by degrees to 2 inches. A tube made of sumach or elder is then inserted $\frac{1}{2}$ inch within the wood. As many as 20 such tubes are sometimes inserted into one tree. The sap flows through these spouts into a trough, whence it is daily conveyed into a large receiver. From this, after being strained, it is carried to a boiler. As it is liable to ferment the sap cannot be kept long after it is collected. The boiling and refining processes are the same as those in the manufacture of cane-sugar. A single tree yields from two to six pounds of sugar in a season, good vinegar is made from it, and a kind of molasses, called "maple-syrup," which is much superior to that from the sugar-cane, and is much used along with buckwheat cakes, etc. Beside New England, the States of Indiana, Michigan, New York, Ohio, and Pennsylvania produce considerable quantities of maple-sugar. The entire product of the United States has reached nearly 85 millions of pounds in one year.

The wood of the sugar-maple has a satiny appearance when polished, and is therefore often used for cabinet-making. Sometimes it is finely marked with undulations of fibre, and is then known as "bird's-eye maple." This kind makes excellent veneers. Maple timber makes also superior saddle-trees. The average height of the maple trees is from 60 to 80 feet. But the dwarf-maple of the Rocky Mountains and the vine-maple of the Pacific Coast are much smaller. See Britannica, Vol. XV, pp. 523, 524.

MAQUI (*Aristotelia Maqui*), the only known species of the genus, which belongs to the natural order *Tiliaceæ*. It is an evergreen shrub of considerable size, a native of Chili, where wine is made

from its berry and administered in malignant fevers. The wood is used for making musical instruments, and the tough bark for their strings.

MAQUOKETA, a city, the county-seat of Jackson county, Iowa, in the eastern part of the State, on Maquoketa River, and on the Davenport & St. Paul and the Iowa Midland railroads.

MARACAYBO, or **MARACAIBO**, **GULF OF**, a wide inlet of the Caribbean Sea, extending from the peninsulas of Paragana and Guajira to the strait by which it is connected with the lake. The latter forms the floor of a great valley shut in by lofty mountains. Its waters are sweet, and deep enough for the largest vessels; but the bar at the mouth, where a swift current runs, makes entrance difficult. The gulf and lake were discovered in 1499 by Ojeda, who found here houses built on piles, and so gave the district the name Venezuela ("Little Venice"), which was afterwards extended to the entire country. See *Britannica*, Vol. XIV, p. 222.

MARAJÓ, an island of Brazil, situated between the estuaries of the Amazon and the Para, with an area of nearly 18,000 square miles. It is for the most part low and covered with grass and bush, but in the east and south with dense forest. The soil is fertile, and large herds of cattle are reared in the northeast.

MARATEA, an Italian town of the province of Basilicata. Population, 6,480.

MARATHON, a post-village of Cortland county, N. Y., 50 miles south of Syracuse. It is a shipping point for butter, cheese and live stock. Carriages and cheese-boxes are here manufactured.

MARAVEDI, an old Spanish copper coin in use from 1474 to 1848, worth about one-thirtieth of a penny. There were also at an earlier period maravedis of gold and of silver.

MARBLE, a limestone or carbonate of lime of many varieties. Pure white marble without any clouds, streaks or spots is very scarce in the United States. The best marble quarried in West Rutland, Vt., comes nearest to it. It is used for statuary work. The white marble quarried at Brandon, Vt., is in too thin layers for statuary. Of mottled, clouded and colored marbles there is an abundance in this country. The most beautiful of American colored marbles are those of eastern Tennessee, which are now quite extensively used for ornamental purposes. They have, for instance, been employed in the capitols at Washington, Ohio, Illinois and Iowa, and the Lake Champlain region yields large quantities of colored marble. California has quarries of white marble on the McCloud River, near Copper City. But none has been found yet equal to the Carrara marble for statuary. In 1880 there were 616 quarries being worked in the United States for producing marble and limestone for building purposes. The quantity mined was 66½ millions of cubic feet per annum at a value of \$7,000,000. See *Britannica*, Vol. XV, pp. 528-530.

MARBLEHEAD, a town and port-of-entry of Massachusetts, on a rocky promontory 18 miles northeast of Boston. It is largely engaged in the shoemaking business. Population in 1890, 8,200. See *Britannica*, Vol. XV, p. 580.

MARCEAU, **FRANÇOIS SEVERIN DESGRAVIERS** (1769-1796), a French general, born at Chartres March 1, 1769. On the outbreak of the revolution he was appointed inspector of the national guard in his native town, and in 1792 helped to defend Verdun with a body of volunteers till its surrender. Sent to join the Republican army in La Vendée, he was promoted to the rank of general of division. He commanded the right wing at Fleurus, and after the allies retreated occupied Coblenz. During the campaign of 1796 he was given command of the

first division of Jourdan's army, and sat down to invest Mainz, Mannheim and Coblenz. But whilst covering the retreat of the French at Altenkirchen he was shot on the 19th of September, and died four days later. His body was buried in the entrenched camp at Coblenz, but was transferred to the Panthéon in Paris in 1889.

MARCET, **JANE**, born at Geneva in 1785, died in London June 23, 1855. She was the daughter of a rich London merchant and the author of a popular introduction to chemistry entitled *Conversations on Chemistry*, through which Faraday made his first acquaintance with the subject. She married Alexander Marcet, a Genevan, who settled in London as a doctor in the last years of the 18th century, and later in life devoted himself to experimental chemistry. Besides the book on chemistry, she wrote *Conversations on Political Economy*, which was warmly praised by Macaulay; *Conversations on Natural Philosophy*, and similar books on botany, besides numerous charming *Stories for Very Little Children*.

MARCH, a market-town of Cambridgeshire, from which the Earls of March took their title, is on the Nene, 14 miles east of Peterborough and 16 northwest of Ely. Its church has a fine perpendicular clerestory, with splendid roof. Population of parish, 6,190.

MARCH, **FRANCIS ANDREW**, an American philologist, born at Milbury, Mass., in 1825. He graduated at Amherst College in 1845, and after serving as tutor there for two years, he studied law at New York and was admitted to the bar in 1850. In 1855 he became tutor in Lafayette College, Easton, Pa., where he was made professor of the English language and comparative philology in 1858, and in 1877 lecturer in the law department. March takes rank as one of the first of American philologists. Among his published writings are *A Method of Philological Study of the English Language*; *An Anglo-Saxon Grammar*; *Latin Hymns*; *Parser and Analyser for Beginners*; *Eusebius*; *Tertullian*; *Justin Martyr*, and many contributions to the *Princeton Review*. In 1873 March was elected president of the American Philological Association.

MARCHES, the border districts that run contiguous on each side of the boundary line between England and Scotland, and between England and Wales. The lords of the marches were the nobles to whom estates on the borders were given on condition that they defended the country against the aggressions of the people on the other side. Under the Norman and Plantagenet kings of England there was almost chronic war between the English lords of the marches and the Welsh. The corresponding German word *mark* was in like manner applied to the border countries or districts of the German Empire conquered from neighboring nations, as the marks of Austria, of Brandenburg, Altmark, Steiermark, etc.

MARCHETTI, **FILIPPO**, an operatic composer, born at Rome in 1835, became in 1881 president of a musical college in Rome. His best-known operas are *Romeo e Giulietta* and *Ruy Blas*.

MARCIANISI, an agricultural town of Sicily, situated in a marshy district 12 miles north of Naples. Population, 11,083.

MARCOU, **JULES**, a French geologist, born in 1824. In 1846 he was appointed assistant in the mineralogical department of the Sorbonne, and a year later became traveling geologist for the *Jardin des plantes*. He visited the United States, gathering much important information, and making valuable collections of minerals. In 1853 he entered the United States service and did good work until his health compelled him to return to France.

From 1855 to 1859 he was professor of geology in the Polytechnic school at Zürich, but in 1861 returned to the United States and was associated with Louis Agassiz in the foundation of the Museum of Comparative Zoölogy, having charge of the paleontological department till 1864. In 1875 he again entered the United States service. He is the author of *Recherches géologiques sur la Jura Salinoise* (1848); *Geology of North America* (1858); *Lettres sur les Roches du Jura et leur Distribution géographique dans les deux hémisphères* (1860); *Geological Map of the World* (1861); *De la Science en France* (1869); *A Catalogue of Geological Maps of America* (1884), and *The Taconic System and its Position in Stratigraphic Geology* (1885).

MARCY, RANDOLPH BARNES (1812-1887), an American soldier. He entered the army in 1832, and served in the Black Hawk expedition, on the frontier, in the Mexican war, and in the hostilities against the Seminole Indians. In 1861 he was made brigadier-general and was assigned to inspection duties in the departments of the Northwest, Missouri, Arkansas, Mississippi and the Gulf until 1865, when he was made inspector-general of the division of the Missouri. From 1869 to 1881 he was inspector-general of the United States army. He wrote *Exploration of the Red River in 1852* (1853); *The Prairie Traveler, a Handbook for Overland Emigrants* (1859); *Thirty Years of Army Life on the Border* (1866), and *Border Reminiscences* (1871).

MARCY, WILLIAM LEARNED (1788-1857), an American statesman. See *Britannica*, Vol. XXIII, p. 789.

MAREY, ÉTIENNE JULES, a French physiologist, born at Beaune, in the department of Côte-d'Or, France, in 1830. He studied medicine at Paris, obtaining his degree in 1859. In 1867 he was made professor of natural history in the Collège de France. Dr. Marey has invented several instruments for recording the movements of the heart, lungs, arteries, muscles and other parts of the human body, and made many experiments with them. He has written *Physiologie médicale de la circulation du sang; Du Mouvement dans les fonctions de la vie; La Machine animale*, of which an English translation has appeared in New York in 1874 under the title *Animal Mechanism; Physiologie expérimentale* (1875), and *La Méthode graphique dans les Sciences expérimentales* (1878).

MARDI GRAS, a festival preceding the first day of Lent, or Ash Wednesday; specially observed in New Orleans, and familiarly called "Fat Wednesday;" observed by a unique and gorgeous procession under the direction of "King Carnival."

MARENGO, a flourishing manufacturing town of Illinois, about 65 miles northwest of Chicago. It is the trade-center of a rich agricultural district.

MARENGO, a manufacturing town, the county-seat of Iowa county, Iowa. It is well situated in the midst of an excellent farming and grazing region.

MARGRY, PIERRE, a French historian, born at Paris in 1818. Being one of the archive-keepers of the marine department he was in 1842 commissioned to make researches regarding French expeditions to America. The result of his labors appeared in a series of volumes. Among these are *Les Indian Rewards* (1854); *La Navigation du Mississippi* (1859); *Les Normans dans les Vallées de l'Ohio et du Mississippi* (1860); *Mémoires sur les découvertes et les établissements des Français* (1879). Dr. Margry has also published *Les Navigateurs Français et la Révolution Maritime du XIV^e au XVII^e siècle* (1867), and other works relating to French explorers.

MARHEINEKE, PHILIPP CONRAD, a Protestant theologian, born at Hildesheim, May 1, 1780, died

May 31, 1846. He began to teach at Göttingen in 1804, was appointed a theological professor and university preacher at Erlangen in 1806, and subsequently held theological chairs at Heidelberg and Berlin. After Hegel's death Marheineke was the chief figure among the right wing of that philosopher's disciples.

MARIA CHRISTINA, queen of Spain, born at Naples in 1806, died at Ste. Adresse, near Havre, in 1878. She was the second daughter of King Francis I. of Naples. In 1829 she became the fourth wife of King Ferdinand VII. of Spain. She bore two daughters, one of which was the future Queen Isabella II. The king died in 1833 after declaring the crown inheritable in the female line and appointing the queen as regent in his will. After three months she married a soldier of the royal guard named Muñoz. In 1840 she abolished the municipal liberties of Spain. This produced a general insurrection, which compelled her to abdicate in favor of Marshal Espartero as regent. She retired to Paris. When Isabella was declared of age in 1843 Christina returned to Madrid, took part in public affairs, and was ten years afterwards again driven from Spain. After September, 1864, she again resided in Madrid for four years. She was then driven out of the country in company with her daughter Isabella.

MARIANNA, an episcopal city of Brazil, three miles east of Ouro Preto. The neighboring gold-mines are exhausted. Population, 5,000.

MARIE GALANTE, a French island in the West Indies, discovered by Columbus in 1493. It lies 17 miles southeast of Guadeloupe. Its area is 58 square miles. Population, 15,000. See *Britannica*, Vol. XI, p. 229.

MARIENWERDER, a town of West Prussia, picturesquely situated three miles east of the Vistula and 55 miles by rail south of Danzig. It was founded in 1233 by the Teutonic Knights, and has an old castle and a domkirche (1384). Population, 8,079.

MARIETTA, a prosperous manufacturing town, the county-seat of Cobb county, Ga. It is the seat of several educational institutions. Kennesaw Mountain is about two miles distant. Population in 1890, 3,376.

MARIETTA, a city of Ohio, the oldest town in the State. It has varied manufactures, and remarkable traces of the mound-builders. Population in 1890, 8,308. See *Britannica*, Vol. XV, p. 542.

MARIETTA, a post-borough of Lancaster county, Pa., on the Susquehanna River and on the Columbia branch of the Pennsylvania Railroad, 25 miles southeast of Harrisburg. It has rolling-mills, furnaces, large hollow-ware and enameling works and lumber mills. It is a market for lumber. Population, 2,385.

MARIGOLD, a plant. See *Britannica*, Vol. XV, p. 544.

MARINE CITY, a post-village of St. Clair county, Mich., seven miles below St. Clair, and on St. Clair River. Salt is found here and ship-building is an important industry of the town.

MARINE HOSPITAL SERVICE. This is the medical bureau of the United States Treasury Department, which is charged with the duty of providing relief for the sick and disabled seamen and employés of the United States merchant marine, the management of the national quarantine, examination of the United States merchant marine pilots for color-blindness, examination of officers and men of the United States revenue cutters service as to physical condition, examination of cadets of that service as to their fitness for appointment, physi-

cal examination of surfmen of the life-saving service as to their ability to perform the duties assigned them, and the physical examination of officers and crew of any United States merchant vessel whose master desires such examination. In 1870 an act of Congress was passed that reorganized this service, increased the tax on seamen to forty cents per month, and authorized the Secretary of the Treasury to appoint a "supervising surgeon" to manage all business connected with this service. In 1875 the title of supervising surgeon was changed by act of Congress to "supervising surgeon-general," and the appointment made a Presidential one. In 1884 the monthly tax on seamen was abolished, and a tonnage tax substituted, which is now supplemented by a small annual appropriation.

Since the service has been reorganized in 1871, the surgeon-general has made annual reports to the Secretary of the Treasury, which give detailed statements of the operation of the service, describe interesting cases of diseases and injuries, and give other valuable information, especially in regard to quarantine, hygiene, hospital construction, etc. The medical corps of the service consists of a supervising surgeon-general, a number of hospital surgeons, passed assistant surgeons and assistant surgeons. Hospital stewards are assigned to duty at all the marine hospitals and larger stations, and are graded into three classes, according to efficiency. Acting assistant surgeons are on duty at stations where there are no marine hospitals, and where but few seamen apply for relief.

MARINE LEAGUE, a distance of three miles generally acknowledged as the shore distance over which the nations severally may have exclusive right upon the sea water abutting against their respective coasts. With respect to the limitation of jurisdiction on the sea coast there are two principles universally admitted—first, that the sea is open to all nations; and second that there is a portion adjacent to every nation over which the sovereignty of that nation may rightly extend to the exclusion of every other political claim.

It is difficult in many cases to define the limits of these waters.* Such portions as harbors and waters above low water mark are recognized as within the *lex loci*, and those persons on board of ships are subject to the local laws and regulations as fully as if they were residing on the land. With reference to parts more seaward, the question is more complicated. The cannon-shot limit is the popular rule: "*Finitur terræ dominium ubi finitur armorum vis.*" For all practical purposes this is the marine league of three miles. The United States and Great Britain have agreed to this claim as between themselves but other nations have not. Norway specified in one case four miles, England six miles under an act of George IV., and again twelve miles under the "Hovering Acts." The United States in 1875 claimed the same for revenue purposes, and even as far as the Gulf Stream for the exclusion of belligerents. Spain claimed a six-mile belt round Cuba. Great Britain has been granted by China jurisdiction over British subjects on vessels up to one hundred miles from the coast of China. The question of jurisdiction over bays has been much disputed. St. George's Channel has been diplomatically acknowledged to be British territory, and the Bay of Newfoundland has been legislated for as if British territory. Generally speaking, however, the three-mile limit is acknowledged as the limit. Foreigners have a right of use

over such waters subject to definite limitations. Belligerent acts must not be carried on there; piracy and smuggling can be stopped, and quarantine regulations enforced. The one general rule is that the State may exercise any rights over these waters in defense of herself and her own interests, or in maintaining the right of free passage to all others. It is commonly acknowledged that the "fructus" of the waters belongs to the country, but much difference of opinion exists as to how the nations are to be protected in its enjoyment.

The most conspicuous illustrations of the principle of free navigation of inland seas are to be found in the opening up of the Sea of Marmora and the Black Sea, and in the liberation of the Sound from the toll formerly collected by Denmark—which, as a kind of concession to a small state without enemies, was effected in 1857 by a payment from the European powers of a sum approaching to three and a half millions of pounds sterling. The principle of free navigation has been still further advanced, so as to include navigable rivers. The Congress of Vienna claimed freedom for rivers bordering or separating several States; and first the Rhine, then the Scheldt, Meuse, Po, Vistula, and other rivers were freed from toll and prohibition. The Danube was not liberated until 1856.

From navigation it is but an advance of principle to the other channels of intercommunication. Much remains to be achieved in regard to international railway lines, postal and telegraphic services, and possibly an international free press. In the meantime something has been done by the Postal Union, and the various telegraphic treaties and conventions, to prepare the way for a more liberal and harmonious system.

MARINE STORE: in England, a place for the buying and selling of old ships' materials. Dealers in these articles are bound, under penalty of \$100, to have their name and the words "Dealer in Marine Stores" distinctly painted over their shop; to keep books stating the names of buyers and sellers; not to purchase marine stores from any person apparently under the age of sixteen; and not to cut up any cable or article exceeding five fathoms in length without a permit from justices of the peace.

MARINETTE, the county-seat of Marinette county, Wis., at the mouth of the Menomonee River. The chief business is lumbering. The town contains saw and planing mills, also iron-works. Population, 11,513.

MARINO, a town on the Alban Hills, twelve miles southeast of Rome. It has a castle belonging to the Colonnas, who took it from their rivals, the Orsinis, in 1424, and a cathedral and churches with pictures by Guido, Domenichino, and Guercino. It produces wine and has manufactories of soap, leather, etc.

MARIO, GIUSEPPE, a famous Italian tenor, by birth the Cavaliere di Candia and son of General di Candia, born at Cagliari in 1810, died at Rome, Dec. 11, 1883. He served in the army for some years, but a youthful escapade led to his forsaking Italy for Paris, where he quickly won his way into the most exclusive circles both by the charm of his manners and his exquisite voice. Having contracted debts, however, he accepted the appointment of first tenor of the opera, with a salary of 1,500 francs per month, changing his name at the same time from De Candia to Mario. He made his debut as Robert in *Robert le Diable*, and achieved the first of a long series of operatic triumphs in Paris, London, St. Petersburg, and America. By the famous singer Giulia Grisi he was the father of six daughters. In his later years he lost his fortune through disas-

* See *Government Year Book*, edited by Lewis Sargent, 1889; "Commentaries on International Law" by Sir Robert Phillimore.

trous speculations. In May, 1878, a benefit concert in London yielded him as much as \$5,000.

MARION, the county-seat of Perry county, Ala. It has railroad repair-shops, carriage-factory, two colleges and two female seminaries.

MARION, a railroad center and the county-seat of Linn county, Ia. It contains factories and mills for the manufacture of lint, flour, beer, carriages, furniture, and farm-implements.

MARION, a railroad center and county-seat of Grant county, Ind. It contains wood-working factories, flax factories, a foundry, and flour-mills. Population, 8,734.

MARION, or MARION CENTRE, a city, the county-seat of Marion county, Kan., situated near the center of the State, about fifty miles west of Emporia.

MARION, a railroad center and county-seat of Marion county, Ohio, forty miles north of Columbus. It contains grain elevators, machine-shops, and manufactories of carriages, wagons, rakes, and chains. Population, 8,308.

MARITZA (anc. Hebrus), a river of European Turkey, rising in the Balkans, and flowing east by south past Philippopolis to Adrianople, where it bends and flows south by west to the Gulf of Enos in the Aegean. It is 270 miles long, and is navigable for small boats to Adrianople.

MARKHAM, a village of York county, Ontario, situated twenty-three miles northeast of Toronto, on the Toronto & Nipissing Railroad.

MARKHAM, CLEMENTS ROBERT, C.B., F.R.S., F.S.A., geographer and author, son of the Rev. D. Markham, canon of Windsor, born at Stillingfleet, England, in 1830, educated at Westminster, and entered the navy in 1844. In 1851 he left the navy, and in 1855 became a clerk in the board of control. In 1863 he was elected secretary of the royal geographical society, and in 1867 became assistant-secretary in the India office. In 1868 he was placed in charge of the geographical department in that office. He served in the Arctic expedition in search of Sir John Franklin. He explored Peru and the forests of the Eastern Andes; he introduced the cultivation of the cinchona plant from South America into India; served as geographer in the Abyssinian expedition, and was present at the storming of Magdala. His numerous publications include many translations from the Spanish, and several antiquarian and genealogical works. He edited the "Geographical Magazine" from 1872 to 1878.

MARL, a clay containing a large proportion of lime. If it contains many shells or shell fragments, it is called "shell-marl." Marl is frequently used as a fertilizer. The name "marl" is sometimes also applied to friable clays, or mixtures of clay and sand which are used for the same purpose. But the presence of a notable proportion of lime is essential to marls, properly so called. The green-sands of New Jersey are largely mined for fertilizing purposes under the name of marl. It contains green silicate of iron and potash, which forms its bulk. But some phosphate of lime is also present. Its value depends upon these ingredients. The bulkiness of marl confines its use to the neighborhood in which it is found.

The marls of the United States belong to the cretaceous, the tertiary, and the recent geological formations. The first of these are green sand and marine calcareous marls. The second add to these argillaceous and phosphatic marls. The recent marls are fresh-water calcareous deposits. The first and second kinds of marl occur in great deposits from the upper New Jersey coast throughout nearly all the Atlantic and Gulf States to Texas.

Recent marls are found in small deposits in the New England States, but in very large deposits in Central New York and along the valley of the Hudson. Extensive beds are also found in Ohio.

The green-sand bed of New Jersey is the most important. It is ninety miles long and from six to ten miles wide. The New Jersey farmers use it very largely, some of them using over 1,000 tons each year, strewing it upon their lands as manure. It is sold at fifty cents per ton at the pits. The granular marl loosens the texture of stiff soils and opens them to the air and moisture. The phosphate of lime and potash contained in the marl of New Jersey are a very valuable plant-food. Deposits of phosphate marls have recently also been opened in Alabama, which are claimed to be very valuable on account of their large contents of phosphoric acid.

MARLITT, EUGENE, whose real name was EUGENE JOHN, a German novelist, born at Arnstadt in Thuringia, Dec. 5, 1825, died at Arnstadt, in 1887. Her beautiful voice and musical talent gained her the favor of the princess of Schwarzburg-Sondershausen, who sent her to Vienna, where, after three years of study, she appeared on the stage. But a successfully-begun career was cut short by an affection of the ear, and Fräulein John acted as reader to her patroness till 1863. Retiring in that year into private life, she spent her time in writing romances.

MARRIAGE IN THE UNITED STATES. For article on the general subject of MARRIAGE, see Britannica, Vol. XV, pp. 565-69. Marriage as defined in statutes and courts of the United States is first, the legal union of a man with a woman for life; and, secondly, a mutual agreement formally declared, by which a man and a woman of the proper respective ages and conditions join one another in wedlock. As far as the parties themselves are concerned, it is a civil "contract" implying free consent on both sides; and as far as the State is concerned, the parties must have certain qualities with respect to age, mutual relationship, and freedom from any previous connection. The State sees to it that the contract is not rescinded either by mutual consent nor one-sidedly; because interests of the State and of the children, if there are any, require the affixing of certain permanent duties and obligations upon the contracting parties.

In most of the United States marriage does not require any special formalities. If a man and a woman promise and agree by word of mouth to take each other as husband and wife, the contract and the resulting legal status of marriage are perfected. Their marriage is valid. Such is the decision of the highest courts. Solemnization by a clergyman, or by a civil magistrate, the presence of witnesses, and all the ceremonies usually observed on such occasions, even those provided for by statute, are only means to perpetuate the evidence of the contract made between the two spouses, which itself constitutes the marriage. These ceremonies are not in the least essential to the efficacy of the contract. In States where a license, public notice ("bann"), or other preliminary steps are prescribed by statute, a failure to comply with these provisions does not impair the marriage if it has been contracted without their presence. It merely subjects the delinquent parties to a penalty. The words of the contract by which the parties take each other as husband and wife, must be of present force and operation (*in presenti*). If they are only mutual promises of a future force and operation (*in futuro*), it is held in New York and several other States that no marriage arises, even if it is followed by immediate cohabitation.

MARRIAGE

EPITOME OF STATUTES RELATING TO MARRIAGE.

The subjoined table presents, in brief and convenient form, an epitome of the statutes of the different States and Territories of the United States relating to marriage. The interested reader will do well to consult, on any mooted question which may arise, the special requirements of the latest laws and court decisions relating to marriage in the particular State in which the question is raised:

States.	Minimum Age Required.		Degrees of Consanguinity Prohibited.	Marriage Voided by	Marriage Voidable.	Is license required? (y)	Age Entitled to License Without Parents' Consent.	
	Male.	Fem'e.					Male.	Fem'e.
Alabama.....	17	14	Ancestors, descendants; also brothers, sisters, uncles, aunts, nephews, nieces, step-relatives.	Prohibited degrees; white with negro blood; under age of consent.		Yes	(f) 21	18
Arizona.....	18	16	Ancestors, descendants; also brothers, sisters, uncles, aunts, nephews, nieces, first cousins.	Prohibited degrees; white with negro or Mongolian; under age of consent.		Yes	(g) 18	(g) 16
Arkansas.....	17	14	Same as Arizona.....	Prohibited degrees; bigamous; under age of consent; white with negro blood.	Insanity; incapacity; consent obtained by fraud or force (h).	Yes	21	18
California.....	18	15	Ancestors, descendants; also brothers, sisters, uncles, aunts, nephews, nieces.	Prohibited degrees; bigamous; white with negro blood.	Under age of consent if no cohabitation since attaining such age; insane or idiot; incapacity; force or fraud if no voluntary cohabitation; bigamy.	Yes	21	18
Colorado.....	(a) 14	12	Same as California.....	Same as California.....		Yes	21	18
Connecticut.....	(a) 14	12	Same as Alabama.....	Prohibited degrees; bigamous.		Yes	21	18
Dakota (i).....	18	15	Same as Arizona.....	Prohibited degrees; bigamous.	Same as California.....	Yes	21	18
Delaware.....	(a) 14	12	Same as Alabama, and great nephews and nieces.	Same as California.....	Insane or idiot.....	Yes	21	18
Dist. of Col'bia	(a) 14	12	Same as Maryland.....	Same as Maryland.....		Yes	21	21
Florida.....	(a) 14	12	"Within the Levitical degrees."	Bigamous; white with negro blood.		Yes	21	21
Georgia.....	17	14	"Within the Levitical degrees," and step-relatives.	Prohibited degrees; bigamous; insane when married; physically incompetent; white with negro blood; force or fraud.		Yes	21	18
Idaho.....	18	16	Same as California.....	Same as California.....	Same as California.....	Yes	18	16
Illinois.....	17	14	Same as Arizona.....	Prohibited degrees; insane when married.....		Yes	21	18
Indiana.....	18	16	Same as Arizona.....	Same as California; insane when married.....	Under age of consent; insane or idiot.	Yes	21	18
Iowa.....	16	14	Same as Alabama.....	Same as Dakota.....	Same as Indiana.....	Yes	21	18
Kansas.....	15	12	Same as Arizona.....	Prohibited degrees.....	Same as Indiana.....	Yes	21	18
Kentucky.....	14	12	Same as Delaware.....	Prohibited degrees; bigamous; under age of consent; insane when married; physically incompetent; white with negro blood.	Under age of consent if no cohabitation since attaining age; consent obtained by fraud or force.	Yes	21	21
Louisiana.....	14	12	Same as California.....	Bigamous.....	Consent obtained by fraud or force if no cohabitation before suit; mistake in person.	Yes	21	21
Maine.....	(a) 14	12	Same as Alabama.....	Prohibited degrees; bigamous; insane when married; imprisonment for life.		Yes	21	18
Maryland.....	(a) 14	(c) 12	Same as Alabama.....	Same as California.....		Yes	(g) 21	(g) 16
Massachusetts.....	(a) 14	12	Same as Alabama.....	Prohibited degrees; bigamous; under age of consent without cohabitation; insane when married.		Yes	21	18
Michigan.....	18	16	Same as Alabama.....	Same as Mass.; imprisonment for life; force or fraud.	Same as California.....	Yes	..	..
Minnesota.....	18	15	Same as California.....	Prohibited degrees; bigamous; under age of consent.	Under age of consent if no cohabitation since attaining such age; insane; force or fraud.	Yes	21	18
Mississippi.....	(a) 14	12	Same as Alabama.....	Same as California.....		Yes	21	18
Missouri.....	15	12	Same as California.....	Same as California.....		Yes	21	18
Montana (i).....	21	18	Same as Arizona.....	Same as Dakota.....		Yes	21	18
Nebraska.....	18	16	Same as California.....	Same as Indiana.....	Same as Minnesota.....	Yes	21	18

EPITOME OF STATUTES RELATING TO MARRIAGE—(Concluded).

States.	Minimum Age Required.		Degrees of Consanguinity Prohibited.	Marriage Voided by	Marriage Voidable.	Is license required? (d)	Age Entitled to License Without Parents' Consent.	
	Male.	Fem'e.					Male.	Fem'e.
Nevada.....	(a) 18	(b) 16	Same as Arizona.....	Prohibited degrees: bigamous; white with negro blood; Indian or Mongolian.	Same as Minnesota.....	Yes	21	18
New Hampshire.....	14	12	Same as Alabama; also first cousins.	Same as Dakota.....		Yes		
New Jersey.....	(a) 14	12	Same as Alabama.....	Bigamous and physically incompetent.			21	18
New Mexico.....	18	15	Same as California.....	Prohibited degrees: under age.	Under age of consent.....		21	18
New York.....	18	16	Ascendants, descendants, brothers and sisters.	Prohibited degrees: bigamous; imprisonment for life.	Same as California, and under age of consent; but only when contracted without consent of parent; force or fraud.			
N'th Carolina.....	16	14	Same as California.....	Prohibited degrees: bigamous; under age of consent; insane when married; physically incompetent; white with negro or Indian and negro with Indian		Yes	21	21
Ohio.....	18	16	Same as Arizona.....	Same as Dakota.....		Yes	21	18
Oregon.....	18	15	Same as California.....	Bigamous; prohibited degrees; white with negro, Indian or Mongolian.	Same as Minnesota.....	Yes	21	18
Pennsylvania.....	(a) 14	12	Same as Alabama.....	Same as Dakota.....		Yes	21	21
Rhode Island.....	(a) 14	12	Same as Alabama.....	Prohibited degrees: bigamous, and insane when married.		Yes	21	18
So'th Carolina.....	(a) 14	(c) 12	Same as Alabama.....	Bigamous; insane when married; white with negro or Indian blood	Consent obtained by fraud or force, if marriage not consummated.			
Tennessee.....	(a) 14	12	Same as Alabama.....	Bigamous; white with negro blood.		Yes		
Texas.....	18	14	Same as Alabama.....	Under age of consent; physically incompetent; white with negro	Physical incapacity.....	Yes	21	18
Utah.....	14	12	Same as California.....	Bigamous; mixed blood (African or Chinese).	Age of consent if no cohabitation since that age; force or fraud.	Yes	21	18
Vermont.....	(a) 14	12	Same as Alabama.....	Same as Dakota.....	Same as California, and force or fraud.	Yes	21	18
Virginia.....	14	12	Same as Alabama.....	Bigamous; under age of consent without cohabitation; insane when married; physically incompetent; white with negro.	Prohibited degrees: insane or idiot; physical incapacity.	Yes	21	21
Washington (a).....	21	18	Same as Arizona.....		Same as Minnesota.....	Yes	21	18
West Virginia.....	14	12	Same as Alabama.....		Prohibited degrees: under age; insane; incapacity; white with negro; former spouse living.	Yes	21	21
Wisconsin.....	18	15	Same as California.....	Prohibited degrees: bigamous; insane when married; imprisonment for life.	Same as Minnesota.....		21	18
Wyoming.....	18	16	Same as Arizona.....	Prohibited degrees: bigamous; insane when married.	Same as Indiana, and under age of consent; force, and fraud if parties have not cohabited since.	Yes	21	18

(a) As at common law; no statutory mention. (b) Consent of parents required if under age. (c) Consent of parents required by females under sixteen. (d) A marriage without a license is nevertheless valid; the person solemnizing it is punished. (e) Without parental consent. (f) Parties under 21 years must give \$20 bonds that no lawful impediment exists. (g) Unless parents consent to less, but not under age of consent. (h) Forced marriage is punishable by death to the male participant. (i) Under territorial laws.

For information as to the State laws relative to divorces, see that topic in these Revisions and Additions.

MARROW CONTROVERSY, one of the most strenuous and memorable struggles in the religious history of Scotland. It took its name from a book entitled the *Marrow of Modern Divinity*, written by a Puritan soldier in the time of the commonwealth. The highly evangelical character of this work had made it a great favorite with the few zealous and pious ministers in the Church of Scotland, and in 1718 an edition was published by the Rev. James Hog of Carnock. A committee of the general assembly reported against the work as too free in its offer of salvation, and the assembly formally condemned the book. Twelve ministers protested against this decision and were ultimately rebuked by the assembly, the national sympathy being on whole with the "Representers" or "Marrow-men." The controversy was substantially the same that in 1733 resulted in the deposition of Ebenezer Erskine, and the origination of the "Secession" body.

MARS, MADEMOISELLE. Anne Françoise Boutet-Mouvel (1779-1847), a great favorite at the Theatre Français during the first forty years of the 19th century. She was born in Paris, February 5, 1779, the illegitimate daughter of an actor Moutet and an actress Mars. She began to act before she was thirteen, joined the Théâtre Français in 1799, and died at Paris, March 20, 1847.

MARSEILLES, a thriving town of Illinois, situated on the north bank of the Illinois River, about eighty miles southwest of Chicago. It has an excellent water-power, and manufactories of paper, flour, and agricultural-implements.

MARSH, JAMES (1794-1842), an American clergyman. In 1824 he was ordained as a Congregational clergyman, was professor of languages and Biblical literature at Hampden Sidney College, Va., until 1826, and then till 1833 was president of the University of Vermont. From 1833 till his death he was professor of moral and intellectual philosophy. His principal published work was *Selections from the Old English Writers on Practical Theology* (1830).

MARSH, OTHNIEL CHARLES, an American naturalist, born in 1831. In 1866 he became professor of paleontology at Yale, which position he still holds. He has since devoted himself to the original investigation of extinct vertebrate animals, and in his various explorations above 1,000 new species have been brought to light. He has published descriptions of more than 300 of the more important ones. Prof. Marsh is a member of numerous scientific societies.

MARSHALL, the county-seat of Clark county, Ill. It is a railroad junction and contains flour mills.

MARSHALL, a city, the county-seat of Calhoun county, Mich., on the Michigan Central Railroad. Population, 3,957.

MARSHALL, the county-seat of Saline county, Mo., sixteen miles west of the Mississippi River, in a fine agricultural region where anthracite coal abounds. Population, 4,258.

MARSHALL, a town, the county-seat of Harrison county, Texas, at the junction of three railroads. The town has several foundries, car-wheel works, railway machine-shops, and a good trade in cotton and other products. Population in 1890, 7,196.

MARSHALL, HUMPHREY (1812-1872), an American soldier. He entered the army in 1832, and served in the Black Hawk expedition. In 1846 he became colonel of the 1st Kentucky volunteer cavalry, and distinguished himself in the war with Mexico. From 1849 to 1852 he was a Congressman from Kentucky, and from 1852 to 1854 United States minister to China. From 1855 to 1859 he was again in Congress. At the beginning of the civil

war he recruited a large body of men for the Confederate army, and accepted a commission as brigadier-general. He won distinction by his gallantry in several battles, but in 1862 resigned, and settled in Louisville, Ky., where he acquired a large law-practice.

MARSHALL, THOMAS ALEXANDER (1794-1871), an American jurist. He began the practice of law in Frankfort, Ky., and in 1819 removed to Paris, Ky. In 1827-'28 he was a member of the legislature, and from 1831 to 1835 was in Congress. From 1835 to 1856 he was judge of the court of appeals, and from 1836 to 1849 was professor in the law-school of Transylvania. In 1866-'67 he was chief justice of the court of appeals.

MARSHALL, THOMAS FRANCIS (1801-1864), an American lawyer. He began the study of law in Versailles, Ky., and from 1832 to 1836, and again in 1838-39 he was a member of the legislature. From 1841 to 1843 he was a member of Congress, and in 1846 raised a company of cavalry and served in the Mexican war. His last years were devoted to the study of geology and history.

MARSHALL, WILLIAM CALDER, a Scotch sculptor, born at Edinburgh in 1813. After studying art in Edinburgh, London, and Rome, he settled in London in 1839, was elected an associate of the Royal Academy in 1844 and an academician in 1852. He devoted himself chiefly to poetic sculpture. Among his works are *The Broken Pitcher*; *Dancing Girl Reposing*; *Sabrina*; *Zepher and Aurora*, and many statues, as those of *Lords Clarendon and Somers* for the houses of parliament, of *Sir Robert Peel*, at Manchester, and of *Jenner*, at Kensington Gardens.

MARSHALLTOWN, a city of Iowa, finely situated on high ground. It has a high-school, railway-shops, flour, and oil-mills, foundries, large grain elevators, and two factories for making steel fencing-wire. Its trade in wheat and flour is considerable. Population, in 1880, 6,240; in 1890, 9,308. See *Britannica*, Vol. XV, p. 574.

MARSHFIELD, a city of Wood county, Wis., having large lumber manufactories.

MARSH-MARIGOLD (*Caltha*), a genus of plants of the natural order Ranunculaceae, having about five petal-like sepals, but no petals; the fruit consists of several spreading, compressed, many-seeded follicles. *C. palustris* is a British plant with kidney shaped, shining leaves, and large yellow flowers. It is often called Cowslip in the United States.

MARSIVAN, a town of Asia Minor, in the vilayet of Sivas, twenty-three miles northwest of Amasia, with a silver mine. Population, 11,000.

MARSTON, WESTLAND, dramatic poet, born at Boston, England, Jan. 30, 1820, died in London, Jan. 5, 1890. In 1842 his *Patrician's Daughter* was brought out at Drury Lane by Macready. Although his house had once been the gathering place of several of the most prominent literary men in London, Marston died in that city alone (wife, children, grandchildren, all dead before him).

MARTELO TOWERS, solid round towers for coast defense, about 40 feet high, situated on the beach. They were so called because at Mortella Point in Corsica a small round tower stood admirably an immense cannonade from an English fleet under Lord Hood in 1794. They were mostly erected at the end of the 18th century as a defense against French invasion, and are now regarded as obsolete.

MARTENSEN, HANS LASSEN (1808-1884), a Danish theologian, born at Flensburg, in 1808. He studied at the universities of Copenhagen, Berlin, Vienna, Munich, and Paris, and was made professor of philosophy at Copenhagen, in 1840, but afterwards transferred to the department of theology. In 1845

he became court-preacher, and in 1853 was made bishop of Zealand. He was a leader in the great religious movement of his time. He published *Mester Eckart; Outline of a System of Ethics, and System of Christian Ethics* (1872). His *Christian Dogmatics and Sermons* were much read in Denmark.

MARTIAL LAW, the exercise of arbitrary power by the military authorities of a district or country wherein the ordinary administration has ceased to be operative either on account of civil disturbance or because of the presence therein of a hostile force. It is not the same as "military law." The latter is the law which governs the army and soldiers at all times, but affects civilians only when they accompany a military force on active service. Martial law is, in fact, no law at all, but simply the will of the supreme authority. No rules can be laid down for its application. The regulations of the United States army give some of the conditions under which martial law may be exercised and by which its functions are limited.

1. "A place, district, or country occupied by an enemy stands, in consequence of the occupation, under the martial law of the invading or occupying army, whether any proclamation declaring martial law, or any public warning to the inhabitants, has been issued or not. Martial law is the immediate and direct effect and consequence of occupation or conquest. The presence of a hostile army proclaims its martial laws.

2. "Martial law does not cease during the hostile occupation, except by special proclamation, ordered by the commander-in-chief; or by special mention in the treaty of peace concluding the war, when the occupation of a place or territory continues beyond the conclusion of peace as one of the conditions of the same.

3. "Martial law in a hostile country consists in the suspension, by the occupying military authority, of the criminal and civil law, and of the domestic administration and government in the occupied place or territory, and in the substitution of military rule and force for the same, as well as in the dictation of general laws, as far as military necessity requires this suspension, substitution, or dictation. The commander of the forces may proclaim that the administration of all civil and penal law shall continue, either wholly or in part, as in times of peace, unless otherwise ordered by the military authority.

4. "Military oppression is not martial law; it is the abuse of the power which that law confers. As martial law is executed by a military force, it is incumbent upon those who administer it to be strictly guided by the principles of justice, honor and humanity—virtues adorning a soldier even more than other men, for the very reason that he possesses the power of his arms against the unarmed.

5. "Martial law should be less stringent in places and countries fully occupied and fairly conquered. Much greater severity may be exercised in places or regions where actual hostilities exist, or are expected and must be prepared for. Its most complete sway is allowed—even in the commander's own country—when face to face with the enemy, because of the absolute necessities of the case, and of the paramount duty to defend the country against invasion. To save the country is paramount to all other considerations.

6. "All civil and penal law shall continue to take its usual course in the enemy's places and territories under martial law, unless interrupted or stopped by order of the occupying military power; but all the functions of the hostile government—legislative, executive, or administrative—whether of a general, provincial, or local character, cease under martial law, or continue only with the sanction, or, if deemed necessary, the participation of the occupier or invader.

7. "Martial law extends to property, and to persons, whether they are subjects of the enemy or aliens to that government.

8. "Consuls, among American and European nations, are not diplomatic agents. Nevertheless, their offices and persons will be subjected to martial law in cases of urgent necessity only; their property and business are not exempted. Any delinquency they commit against the established military rule may be punished as in the case of any other inhabitant, and such punishment furnishes no reasonable ground for international complaint.

9. "The functions of ambassadors, ministers, or other diplomatic agents, accredited by neutral powers to the hostile government, cease, so far as regards the displaced government; but the conquering or occupying power usually recognizes them as temporarily accredited to itself.

10. "Martial law affects chiefly the police and collection of public revenue and taxes, whether imposed by the expelled government or by the invader, and refers mainly to the support and efficiency of the army, its safety, and the safety of its operations.

11. "The law of war (martial) does not only disclaim all cruelty and bad faith concerning engagements concluded

with the enemy during the war, but also the breaking of stipulations solemnly contracted by the belligerents in times of peace, and avowedly intended to remain in force in case of war between the contracting powers. It disclaims all extortions and other transactions for individual gain; all acts of private revenge, or connivance at such acts. Offenses to the contrary shall be severely punished, and especially so if committed by officers.

12. "Whenever feasible, martial law is carried out in cases of individual offenders by military courts; but sentences of death shall be executed only with the approval of the chief executive, provided the urgency of the case does not require a specific execution, and then only with the approval of the chief commander."

In the United States, at the time of peace, martial law must be declared by proclamation by the executive of the State or territory, or by the President of the United States, if there is a riot, insurrection, or other disturbance. It is limited to the extent of the disturbed territory and the executive jurisdiction under the laws.

MARTIGNY LA VILLE, a town of Switzerland, canton of Valais, seventeen miles southwest of Sion, on the Dranse. Population, 1,490.

MARTIN, BON LOUIS HENRI, a French historian, born at St. Quentin, Feb. 20, 1810, died at Paris, Dec. 14, 1888. He wrote dramas and historical novels for a while; but about 1880 he gave himself up to the writing of history, joining Paul Lacroix, "Bibliophile Jacob," in his vast project for a history of France in 48 volumes, consisting of extracts from historians and chronicles from the earliest period to 1880. He published the first volume in 1883, and hence forward toiled alone at the vast undertaking, which was completed on a smaller scale in 1896. He now set himself to a still more gigantic task, his great *Histoire de France*. A third and much improved edition earned the Gobert prize; the fourth edition was awarded by the institution in 1899 the great prize of 20,000 francs. This magnificent work comes down only to 1789; its continuation to the author's own time formed the less admirable *Histoire de France Moderne*. Martin acted for a time as maire of one of the arrondissements of Paris; and was chosen deputy for Aisne in 1871, senator in 1876. He was elected a member of the French academy in 1878. He wrote several minor histories, such as the *Histoire de Soissons*; *Daniel Manin*, and *Jeanne d'Arc*. Martin was the last of the giants of French history influenced by Augustin Thierry, who aimed at comprehending the whole field within their range of study. The whole work reveals impartiality and insight, is excellently arranged, and admirably written—the work of a true patriot, and if a Chauvinist, a Chauvinist of genius. It is beyond doubt the best work dealing in detail with the history of France as a whole.

MARTIN, FELIX, a Canadian author, born in France in 1804. He was sent to Canada in 1842 as a Jesuit missionary, and was stationed first at Montreal, then at Quebec. Afterwards he returned to France, and connected himself with a Jesuit establishment near Paris. Among his works are *Manuel du Pèlerin de Notre Dame de Bon Secours* (1848); *Relation des Jésuites* (1850); *Mission du Canada Relations Inédites* (1861); *De Montcalm en Canada* (1867), and *Le R. P. Isaac Jogues* (1873).

MARTIN, FRANÇOIS XAVIER (1764-1846), an American jurist. He was admitted to the bar in New Berne, N. C., in 1789, and in 1806-7, was a member of the legislature. In 1809 he became United States judge for the territory of Mississippi, and in 1810 of Orleans. In 1813 he was made attorney-general of Louisiana, and in 1815 judge of the supreme court. In 1835 he became chief justice, and in 1846 retired. He wrote several works on law and history.

MARTIN, LUTHER (1748-1826), an American lawyer. In 1771 he was admitted to the bar, and settled in Somerset, Md., where he attained a large practice. In 1778 he was appointed attorney-general of Maryland, resigning in 1805. From 1814 to 1816 he was chief judge of the court of oyer and terminer in Baltimore, and from 1818 to 1820, was again attorney-general. In 1804 he appeared as counsel for the defense in the impeachment of Samuel Chase before the United States Senate, and in 1807 for Aaron Burr in the latter's trial at Richmond.

MARTIN, SIR THEODORE, born in Edinburgh in 1816, educated there at the high-school and university, and in 1846 settled in London and became a prosperous parliamentary solicitor. Among his earliest writings were the well-known *Bon Gaultier* ballads, written in conjunction with Professor Aytoun. This was followed by numerous translations of Göthe and other poets. In 1863 he issued a volume of original and translated poems, and in 1870 an admirable little book on Horace in the *Ancient Classics for English Readers*. In 1875 he was made C. B., in 1880 K. C. B., and in November of that year was elected Lord Rector of St. Andrews University. **LADY MARTIN**, well-known as an actress by her maiden name, Helen Faucit, born Oct. 11, 1820, made her professional début as Julia in the *Hunchback* at Covent Garden in January, 1866. After her marriage in 1851 she left the stage; but appeared occasionally for charitable purposes. In 1885 she published a volume of studies *On Some of Shakespeare's Female Characters*.

MARTINEAU, HARRIET (1802-1876), an English authoress. See *Britannica*, Vol. XV, pp. 583-584.

MARTINEAU, JAMES, an English theologian, brother of Harriet, born at Norwich, April 21, 1805. He was educated at the grammar-school of his native city, and was appointed professor of mental and moral philosophy at Manchester New College. He removed to London when that institution was transferred thither in 1857. He became principal of the college in 1868, and held the office till his retirement in 1885. Martineau was recognized for fifty years as one of the profoundest thinkers and most effective writers of his day. He received the degree of LL. D. from Harvard in 1872. Doctor in Theology from Leylen in 1875, and D. D. from Edinburgh in 1884.

MARTINSBURG, a town in West Virginia. Population in 1890, 7,207. See *Britannica*, Vol. XV, p. 587.

MARTIN'S FERRY, or **MARTINSVILLE**, a village of Belmont county, Ohio, celebrated for its iron, glass and mill machinery. Population, 6,247.

MARTINSVILLE, a post-village, the county-seat of Morgan county, Ind., 31 miles southwest of Indianapolis on White River. It has a large grain trade and contains a foundry, a machine-shop, a woolen factory, a flour-mill, a pork-house and saw-mills.

MARUT, in Hindu mythology, the god of wind.

MARVIN, ENOCH M., a bishop of the M. E. Church, South, born in Missouri in 1823, died Nov. 26, 1877. He was elected bishop in 1866, and completed a missionary tour "round the world" in 1877.

MARX, KARL, a German socialist, born at Cologne in 1818, died in London in 1883. After studying law and philosophy at Bonn and Berlin, he edited in Cologne the "*Rhenish Gazette*" in 1842, which was suppressed the next year for its radical utterances. He then went to Paris and there began in the *Deutsch-Französische Jahrbücher* that course of literary activity, which, varied by agitation, constituted the work of his life. Expelled from France in 1845 he settled in Brussels, where

he wrote his attack on Proudhon's *Philosophie de la Misère*, entitled *Misère de la Philosophie*. In 1848 Marx took an active part in the revolutionary movement on the Rhine, and after its failure finally settled in London in 1849. Here he acquired his great knowledge of the economic development of modern Europe. The early fruits of his studies appeared in a work: *Zur Kritik der politischen Oekonomie* (1859). The theories underlying it were carried forward into the first volume of his *Kapital* (1867). Before that year Marx had, in 1864, resumed his work as agitator. He had the foremost part in founding the "International Workingmen's Association," commonly called the "International" (see *Britannica*, Vol. XIII, p. 189). After Lozalles death he had practical control of the social-democratic movement in Germany. His works leave us in no doubt that he was a man of extraordinary knowledge, which he handled with masterly skill. His style is lucid and powerful, and the march of thought is varied by humor, unsparing invective and flashes of light from unexpected quarters.

MARY MAGDALENE, or **MARY of MAGDALA**, so named from a town on the Sea of Galilee, a woman out of whom Jesus cast seven devils and who believed on and followed him. She was one of the women who stood by his cross, and one of those who went with sweet spices to the sepulcher. To her he first appeared after his resurrection. In consequence of an unfounded notion identifying her with the woman mentioned in Luke VII, 36-50, who anointed our Lord's feet with ointment and wiped them with the hairs of her head, Mary Magdalene has been long and generally regarded as a woman whose early life had been profligate, although of this there is no hint whatever in the narratives of the evangelists, and the Magdalenes so frequent among works of art represent her according to this prevalent opinion.

MARYLAND, STATE of. For general article on the STATE of MARYLAND, see *Britannica*, Vol. XV, pp. 602-605. The census of 1890 reported the area and population as follows: Total area of the State (including 2,350 square miles of water surface) 12,210 square miles. Population, 1,042,390, a gain during the decade of 107,447, or 11.49 per cent. Capital, Annapolis, with a population of 7,675, a gain during the decade of 1,033, or 15.58 per cent.

BRIEF HISTORIC RECORD OF MARYLAND.—The first white settlement was made on Kent Island in Chesapeake Bay, by William Clayborne, from Virginia in 1631. In 1632 a charter was granted to Cecilus Calvert, second Lord Baltimore. In 1633 he sent out his brother, Leonard Calvert, as governor. In 1645 there was a rebellion starting in Kent and Lord Calvert fled to Virginia. In 1651 commissions from England fully reestablished authority. A civil contest ensued and the proprietary party was defeated and driven out of the country in 1655.

In 1658 Lord Baltimore regained his proprietary rights, and his brother, Philip Calvert, was appointed governor in 1661. At this date the colony began to prosper rapidly. In 1750 the boundary between Maryland and Pennsylvania was determined by the survey of Commissioners Mason and Dixon. The constitution of the State was adopted Aug. 14, 1776. Maryland ratified the constitution of the United States April 28, 1788, by a vote of 63 to 11. In 1851 the State constitution was remodeled and still further revised in 1864 and 1867. The name of the State was derived from that of Henrietta Maria, Queen of Charles I., of England.

For numerous additional items of interest, see the article UNITED STATES in these Revisions and Additions.

PROGRESS OF THE STATE OF MARYLAND IN POPULATION BY DECADES.—Population in 1790, 319,728; 1800, 341,548; 1810, 380,546; 1820, 307,350; 1830, 447,040; 1840, 470,019; 1850, 583,034; 1860, 687,049; 1870, 780,894; 1880, 934,943; 1890, 1,042,390.

The population of the chief cities and towns in 1890 were as follows: Baltimore, 433,547; Cumberland, 10,030; Frederick, 9,621; Hagerstown, 11,698; Cambridge, 4,163; Havre de Grace, 3,219; Easton, 2,938; Salisbury, 2,905.

The following figures show the land areas in square miles and the populations of the several counties of the State in 1890:

Counties.	Area.	Population.	
		1890.	1880.
Allegany.....	477	41,571	38,012
Anne Arundel.....	400	34,094	28,526
Baltimore.....	622	72,909	83,836
Baltimore city.....	28	433,547	332,813
Calvert.....	218	9,860	10,538
Caroline.....	315	18,903	13,766
Carroll.....	426	32,376	30,992
Cecil.....	375	25,851	27,108
Charles.....	460	15,191	18,548
Dorchester.....	610	24,843	23,110
Frederick.....	633	49,512	50,482
Garrett.....	680	14,213	12,175
Harford.....	423	28,993	28,042
Howard.....	250	16,269	16,140
Kent.....	315	17,471	17,605
Montgomery.....	508	27,185	24,759
Prince George.....	480	26,080	26,451
Queen Anne.....	352	18,461	19,257
Saint Mary.....	360	15,819	16,994
Somerset.....	365	24,155	21,663
Talbot.....	285	19,736	19,065
Washington.....	435	39,782	38,551
Wicomico.....	369	19,930	18,016
Worcester.....	475	19,747	19,539

The subjoined list gives the names of the governors of the State of Maryland from the beginning, and their dates of official service:

LORDS PROPRIETARY.

Cecilus Calvert, second Lord Baltimore.....	1632-75
Charles Calvert, third Lord Baltimore.....	1675-1715
Benedict Leonard Calvert, fourth Lord Baltimore.....	1715
Charles Calvert, fifth Lord Baltimore.....	1715-51
Frederick Calvert, sixth Lord Baltimore.....	1751-71
Sir H. Harford, last proprietary.....	1771-76

GOVERNORS APPOINTED BY THE LORDS PROPRIETARY.

Leonard Calvert.....	1633-47
Thomas Greene.....	1647-49
William Stone.....	1649-54
Commissioners under Parliament.....	1654-53
Josiah Feildall.....	1653-61
Philip Calvert.....	1661-65
Charles Calvert.....	1662-67
Charles, third Lord Baltimore.....	1677-78
Thomas Notley.....	1678-81
Charles, third Lord Baltimore.....	1681-85
William Joseph, Pres. of Deputies.....	1685-89
Convention of Protestant Association.....	1689-92

ROYAL GOVERNORS.

Sir Lionel Copley.....	1692-93	Thomas Trench, Pres.....	1703-4
Sir Edmund Andros.....	1703-94	John Seymour.....	1704-9
Francis Nicholson.....	1694-99	Edward Lloyd, Pres.....	1709-14
Nath. Blackistone.....	1699-1703	John Hart.....	1714-15

PROPRIETARY GOVERNMENT.

John Hart.....	1715-20	Samuel Ogle.....	1735-42
Charles Calvert.....	1720-27	Thomas Bladen.....	1742-47
Benedict L. Calvert.....	1727-32	Samuel Ogle.....	1747-52
Samuel Ogle.....	1732-35	Benj. Tasker, Pres.....	1752-53
Charles, fifth Lord of Baltimore.....	1733-35	Horatio Sharpe.....	1753-55
		Robert Eden.....	1769-74

THE REVOLUTION.

The Convention and Council of Safety.....1774-78

STATE GOVERNMENT.

[Annual Elections, 1777-1838.]

Thomas Johnson.....	1777-79	Robert Bowie.....	1811-12
Thomas Sim Lee.....	1779-82	Levin Winder.....	1812-15
William Paca.....	1782-85	C. Ridgely of Hampton.....	1815-18
William Smallwood.....	1785-88	Charles Goldsborough.....	1818-19
John Edgar Howard.....	1788-91	Samuel Sprigg.....	1819-22
George Plater.....	1791-92	Samuel Stevens, Jr.....	1822-25
Thomas Sim Lee.....	1792-94	Joseph Kent.....	1825-28
John H. Stone.....	1794-97	Daniel Martin.....	1828-29
John Henry.....	1797-98	Thomas King Carroll.....	1829-30
Benjamin Ogle.....	1798-1801	Daniel Martin.....	1830-31
John Francis Mercer.....	1801-3	George Howard.....	1831-32
Robert Bowie.....	1803-6	George Howard.....	1832-33
Robert Wright.....	1806-9	James Thomas.....	1833-35
Edward Lloyd.....	1809-11	Thomas W. Veazey.....	1835-38

[Constitution of 1838. Three-Year Terms.]

William Grason.....	1838-41	Thomas G. Pratt.....	1844-47
Francis Thomas.....	1841-44	Philip F. Thomas.....	1847-60
Enoch Lewis Lowe.....			1850-53

[Constitution of 1851. Four-Year Terms.]

Thos. Watkins Ligon.....	1853-57	[Thos. Haliday Hicks.....	1857-61
Augustus W. Bradford.....			1861-65

[Constitution of 1864. Four-Year Terms.]

Thomas Swan.....			1865-69
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[Constitution of 1867. Four-Year Terms.]

Oden Bowie.....	1869-72	William T. Hamilton.....	1890-84
Wm. Finckney White.....	1872-75	Robert M. McLane.....	1884-85
James B. Groom.....	1875-76	Henry Lloyd.....	1885-88
John Lee Carroll.....	1876-80	Elihu E. Jackson.....	1888-92

Gov. Jackson's term of service expires Jan. 11, 1892. Governor's salary, \$4,500.

MARYSVILLE, a city, a railroad center and the county-seat of Yuba county, Cal., situated at the confluence of Feather and Yuba rivers. It manufactures woolen goods, flour and carriages. Population, 3,936.

MARYSVILLE, a city, the county-seat of Marshall county, Kan., on the east bank of Big Blue River. By means of a dam across the river the water-power is utilized by several mills.

MARYSVILLE, a city, the county-seat of Union county, Ohio, about 30 miles northwest of Columbus.

MARYSVILLE, a railroad center, a city and the county-seat of Nodaway county, Mo., 45 miles north of St. Joseph. Stock-raising and farming are the chief industries. Population, 4,017.

MARYVILLE, a manufacturing town, the county-seat of Blount county, Tenn., about 15 miles south of Knoxville. It is the seat of Maryville College and the Freedman's College.

MASENIA, or MASENA, a walled town of Africa, capital of Baghirmi, 100 miles southeast of Lake Chad. It is fairly well constructed on very rough ground, has a brick palace for the sultan, and is a place of considerable trade, but is decaying on account of its extreme unhealthiness.

MASON, a city, the county-seat of Ingham county, Mich., 12 miles south of Lansing. It has several mills.

MASON, a post-village of Mason county, W. Va., on the south bank of the Ohio River, opposite Pomeroy, Ohio. It is a coal mining and shipping point, manufactures nails and obtains salt from artesian wells.

MASON, CHARLES (1730-1787), an American astronomer. For several years he was assistant at the Greenwich observatory, and in 1763 was commissioned with Jeremiah Dixon to survey the boundary line between Pennsylvania and Maryland. In 1766 Mason and Dixon devoted some time, at the request of the Royal Astronomical Society, to determining the precise measure of a de-

gree of latitude in America in the neighborhood of Pennsylvania, and in 1869 Mason observed the transit of Venus at Cavan, Ireland. He was subsequently employed by the Bureau of Longitudes to verify the lunar tables of Tobias Mayer.

MASON, GEORGE (1725-1792), an American statesman. In 1776 he drafted the declaration of rights and the constitution of Virginia, which were unanimously adopted, and in 1787 was a member of the convention that framed the constitution of the United States. He was twice elected to the Continental Congress, but declined to serve; and was chosen the first United States Senator from Virginia, refusing also to act in this capacity. He then retired to his home on the Potomac, where he resided till his death.

MASON, JAMES MURRAY (1798-1871), a United States Senator. He began the practice of law in Winchester, Va., was a member of the house of delegates from 1826 to 1832, and from 1837 to 1839 was a member of Congress. In 1847 he was chosen to the United States Senate, and was twice reelected, serving till 1861. He was then appointed Confederate commissioner to England. He returned to Virginia in 1868 and resided there until his death.

MASON, JEREMIAH (1768-1848), a United States Senator. In 1791 he was admitted to the New Hampshire bar, and in 1802 became attorney-general of the State. From 1813 to 1817 he was a United States Senator, and then for several sessions was a member of the legislature. From 1829 to 1832 Mason was president of the Portsmouth, N. H., branch of the United States bank. He then settled in Boston and continued his practice of law until 70 years of age.

MASON, JOHN, the founder of New Hampshire, died in 1635. In 1616 he was sent to Newfoundland from England as governor, and during the war with Spain from 1624 to 1629 was treasurer and paymaster of the English forces. He then procured a grant of territory on the coast between the Merrimack and Piscataqua rivers, which was designated as New Hampshire, and soon afterwards formed a colony there. Just before his death he was appointed vice-admiral of New England.

MASON, JOHN (1600-1672), an American soldier. In 1635 he aided in founding the town of Windsor, Conn., and in 1637 commanded a successful expedition against the Pequod Indians, in which he annihilated, with a handful of whites, a powerful tribe, and secured a general peace with the Indians, which remained unbroken for forty years. Mason then settled in Saybrook and later in Norwich, and was major of the colonial forces more than thirty years. From 1642 to 1663 he was a magistrate, and from 1660 to 1670 the deputy governor of Connecticut.

MASON, JOHN MITCHELL (1770-1829), an American Calvinistic clergyman. In 1792 he became pastor of the Cedar street Associate Reformed Church, New York City, resigning in 1810 to form a new congregation. In 1811 he was chosen provost of Columbia College, and in 1821 president of Dickinson College, Pa. He resigned in 1824 on account of failing health, and was never again able to assume any official employment. Dr. Mason published a number of orations, addresses and sermons, and among other works *A Plea for Sacramental Communion on Catholic Principles* (1816).

MASON, JOHN YOUNG (1799-1859), a United States cabinet officer. In 1819 he began the practice of law in Southampton county, Va., and was a member of the legislature in 1829. From 1831 to 1837 he was a member of Congress, and later was judge of the United States district court and of the circuit court of Virginia. In 1844 he became Sec-

retary of the Navy, and in 1845 was appointed United States attorney-general; but the following year was again placed at the head of the navy department. From 1853 till his death he was United States minister to France.

MASON, SIR JOSIAH, an English philanthropist, born at Kidderminster, Feb. 23, 1795, died at Erdington, June 16, 1881. He began life by selling cakes on the street, and after turning his hand to various employments took the split-ring business of Mr. Harrison at Birmingham. He began to make pens for Perry & Co., and his business increased till he became the largest penmaker in the world. Partner with Elkington in the electro-plating trade he gave Dr. C. W. Siemens his first start in life by paying him \$8,000 for a patent; and he paid Krupp, founder of the works at Essen, \$50,000 for the patent for machinery to roll the metal "blanks" from which spoons and forks are made. Mason erected and endowed almshouses, and an orphanage at Erdington, at a cost of \$1,300,000, and was the founder of the Josiah Mason College at Birmingham.

MASON, LOWELL (1792-1872), an American musician. At the age of sixteen he was so proficient in vocal music that he was the leader of a Massachusetts village choir, and a teacher of singing-classes. From that time until his death he devoted his entire time to music, and probably did more to popularize vocal music than any other American. Among the books that he compiled are *Juvenile Psalmist* (1829); *Juvenile Lyre* (1830); *The Choir, or Union Collection* (1832); *Manual of Instruction in Vocal Music* (1834); *The Boston Academy Collection* (1835); *Lyra Sacra* (1837); *Occasional Psalmody* (1837); *Songs of Asaph* (1838); *The Seraph* (1838); *The Modern Psalmist* (1839); *Carmena Sacra* (1841); *The Gentleman's Glee Book* (1842); *American Sabbath-School Singing Book* (1843); *Boston Academy Collection of Choruses* (1844); *Song-Book of the School Room* (1845); *Primary-School Song-Book* (1846); *The National Psalmist* (1848); *The Hand-Book of Psalmody* (1852); *The Hallelujah* (1854); *The Normal Singer* (1856), and *Mammoth Musical Exercises* (1857).

MASON AND DIXON'S LINE, popularly supposed to have been a line dividing the slaveholding from the non-slaveholding States, and to have run due east and west. In reality it ran for more than one-third of its length between two slave States, Maryland and Delaware, and a small part of it is an arc of a circle. It was run by two English engineers, Charles Mason and Jeremiah Dixon, between the years 1764 and 1767, for the purpose of settling the disputed boundaries between Maryland on the one side and Pennsylvania and Delaware on the other. Their instructions were to begin at the most easterly point on the Atlantic Ocean, and run due west to a point midway between the Atlantic and the Chesapeake Bay; thence northward, so that the line should become a tangent to the northwestern boundary of Delaware, which was a circle described from New Castle Court-house as center, with a radius of twelve miles. The line was then to follow the curve in a westerly direction until it reached a point due north of the point of tangency; thence due north until it intersected a line run due west from a point fifteen miles south of Philadelphia; and thence due west until it intersected a line running due north from the most western source of the Potomac River. The work was done with such skill and accuracy that a revision in 1849, with instruments of much greater precision disclosed no error of importance. See *Britannica*, Vol. XV p. 605; XVIII, p. 504.

MASON CITY, a town of Mason county, Ill., situated in the best corn-growing region of the State.

MASON CITY, an incorporated town, the county-seat of Cerro Gordo county, Ia. It has flour-mills, limestone quarries, good water-power, and is situated in a good agricultural region. Population, 4,002.

MASONIC TEMPLE, CHICAGO. This new and imposing edifice (now in process of erection, Aug. 18, 1891), is located on the corner of State and Randolph streets, Chicago, Ill. The site, all of which will be covered by the temple, measures 170 feet on State street and 114 feet on Randolph street, and is surrounded by streets and alleys. The corner stone was laid with imposing ceremonies in 1890, and the contractors are to hand over the keys of the completed structure to the representatives of the Masonic order, May 1, 1892.



MASONIC TEMPLE, CHICAGO, ILL.

The new building will rest on cement and iron foundations, extending far out into the adjacent thoroughfares, and the superstructure will be of steel and perfectly fire-proof from bottom to top. It will have twenty stories, and the height of the building will be nearly 255 feet. The first three stories will be faced with dressed red Montello granite from Wisconsin, with glimpses of carving, the corners being ornamented with electrical layers. The remaining stories will be faced with gray brick that is indistinguishable from granite, each measuring four by five by fourteen inches. Between the sixteenth and seventeenth stories terra cotta of the same shade will be used. No particular style of architecture can be predicted of this building, though the arches visible on some parts of the gigantic facade suggest the Romanesque. The design presents a faint semblance of a main building in the center with wings at each side. These wings terminate in steep gables on the east and west fronts, connected by the steep roof of the central portion of the structure. There are seventeen stories below the cornice and three above it. All

four fronts will be finished in exactly the same costly and elegant style. There will be three tiers of deeply recessed bay windows on each front, extending from the third to the fifteenth story, both inclusive. The windows of the second and sixteenth stories are combined in groups of two, within deep Roman arches. The seventeenth story is treated separately from the rest of each facade. The entrance will be through an immense granite arch twenty-eight feet wide and forty-two feet high in the center of the State street front.

This gorgeous edifice will have an interior court, something like that of the chamber of commerce building, the floor of which measures 90 feet north and south by 45 feet east and west. The walls of this court will be faced from bottom to top, with different colored marble, and at the east side of it a magnificent bronze staircase will ascend from the ground floor to the roof. The interior finish of the building will be mosaic floors, marble and onyx walls, and all oak woodwork. East of the court, disposed in a semicircle, will be fourteen passenger and two freight elevators, running from the basement to the attic, and making a round trip every three minutes. The whole building will be heated by steam, and supplied with electrical and pneumatic connections in great profusion. The basement will be devoted to an immense east with its appurtenances, and waiting-rooms, toilet-rooms, coal-rooms and boiler-rooms. Perhaps the most surprising thing that can be said concerning this immense building is that every floor of it from the pavement to the eleventh floor inclusive, will be fitted up for shops. There will also be four shop-like booths on the floor of the court. The floors from the eleventh to the sixteenth inclusive will be fitted up as business offices.

Above the sixteenth floor and beneath the roof everything will be sacred to masonry. On the seventeen floor, the entire south wing, 50 by 109 feet in size, will be devoted to a drill hall. The similar space in the north wing will be divided between the blue lodge rooms. The intermediate room, on the State street front, 40 by 80 feet in size, will be a banqueting hall. On the eighteenth floor, over the drill hall, will be a gorgeous consistory room, with arched roof and galleries on three sides. Over the banqueting hall will be parlors. Over the blue lodge rooms will be the Apollo commandery preceptory. In the remaining two stories will be a number of smaller rooms. Even here the description does not end, for on the roof of the building are to be hanging gardens, covered with glass roof and walls that are to rival the abode of the gods. It is given out that there may be refreshments up there, but everything that inebriates will be remorselessly banished.

It is estimated that the cost of the building will be, in round numbers, \$3,000,000, and that the property including the ground and building will represent about \$3,500,000.

MASON WASP (*Odynerus Murarius*), a species of wasp which makes its nest by boring a cylindrical hole in hard sand, or in the plaster of walls, on which an exudation from the mouth seems to act so as to soften it sufficiently. At the orifice an outer tube is constructed, sometimes two or three inches in length, of pellets formed in the excavation. In the interior an egg is deposited, with a number of little caterpillars ready for food for the larvæ when hatched.

MASPERO, GASTON CAMILLE CHARLES, an Egyptologist, born at Paris, of Italian parents, June 23, 1846. He began to lecture on Egyptology at the school of higher studies in Paris, in 1869, and in 1878 was appointed professor of Egyptology at the college of France. In 1881 he founded a school of Egyptian archaeology at Cairo, and succeeded Mariette as director of explorations and custodian of the Boulak museum. In 1886 he became professor at the institute of Paris. As an explorer he has excavated or opened the pyramids of the kings belonging to the 5th and 6th dynasties, and the burial-fields of Sakkara and Dasher, and discovered new sepulchral sites of great value at Deir el-Bahari, near the entrance to the valley of the Tombs of the Kings, at Ekhnim, 130 miles south of Thebes, and at other places.

MASQUERADE, or MASKED BALL, a festive meeting in which the host and guests assume fictitious characters, and disguise themselves more or less for the occasion, the name being derived from the use of the mask. The public mummeries of former times, Easter Plays, Festival of Fools, etc., which were frequent in Europe, probably suggested the idea of the masquerade. Catherine de Medici introduced the regular masquerade at the French Court. It found its way to England in the

reign of Henry VIII, but did not reach any of the courts of Germany till the end of the 17th century.

MASSACHUSETTS, STATE OF. For general article on the STATE OF MASSACHUSETTS, see Vol. XV, pp. 611-616. The census report of 1890 gave the revised figures as to the area and population of Massachusetts as follows: Total area, 8,315 square miles, including 275 square miles of water; population, 2,238,943, a net gain during the last decade of 455,858, or 25.56 per cent. Capital Boston, with a population in 1890 of 448,477, a gain during the decade of 85,638 or 23.60 per cent.

The populations of the chief cities and towns of the State which in 1890 had each over 8,000 inhabitants, are as follows, in the order of rank:

Cities and Towns.	Pop. in 1890.	Pop. in 1880.	Increase.	Per cent.
Boston city.....	448,477	362,839	85,638	23.60
Worcester city.....	84,655	58,291	26,364	45.23
Lowell city.....	77,696	59,475	18,221	30.64
Fall River city.....	74,398	48,961	25,437	51.95
Cambridge city.....	70,028	52,669	17,359	32.96
Lynn city.....	55,727	38,274	17,453	45.60
Lawrence city.....	44,654	39,151	5,503	14.06
Springfield city.....	44,179	33,340	10,839	32.51
New Bedford city.....	40,738	26,845	13,883	51.73
Somerville city.....	40,152	24,933	15,219	61.04
Holyoke city.....	35,637	21,915	13,722	62.61
Salem city.....	30,801	27,568	3,233	11.75
Chelsea city.....	27,909	21,782	6,127	28.13
Haverhill city.....	27,412	18,472	8,940	48.40
Brookton city.....	27,294	18,608	18,686	100.57
Taunton city.....	25,448	21,213	4,235	19.96
Gloucester city.....	24,651	19,329	5,322	27.53
Newton city.....	24,379	16,995	7,384	43.45
Malden city.....	23,031	12,017	11,014	91.65
Fitchburg city.....	22,037	12,429	9,608	77.30
Waltham city.....	18,706	11,712	6,995	59.73
Pittsfield city.....	17,281	13,364	3,917	29.31
Quincy city.....	16,723	10,570	6,153	58.21
North Adams town.....	16,074	10,191	5,883	57.73
Northampton city.....	14,999	12,172	2,818	23.15
Chicopee city.....	14,050	11,286	2,764	24.49
Newburyport city.....	13,947	13,538	409	3.02
Marlborough town.....	13,805	10,127	3,678	36.32
Woburn city.....	13,492	10,951	2,541	23.49
Brookline town.....	12,103	8,097	4,006	50.22
Medford town.....	11,079	7,573	3,506	46.30
Everett town.....	11,068	4,159	6,909	166.12
Weymouth town.....	10,866	10,570	296	2.80
Beverly town.....	10,821	8,456	2,365	27.97
Clinton town.....	10,424	8,029	2,395	29.83
Hyde Park town.....	10,193	7,088	3,105	43.81
Peabody town.....	10,158	9,028	1,130	12.52
Westfield town.....	9,805	7,587	2,218	29.23
Ashburnham town.....	9,798	3,355	6,443	192.04
Farmingham town.....	9,239	6,235	3,004	48.18
Adams town.....	9,213	5,591	3,622	64.78
Natick town.....	9,118	8,479	639	7.54
Milford town.....	8,780	9,310	-530	-5.63
Spencer town.....	8,747	7,466	1,281	17.16
Melrose town.....	8,519	4,560	3,959	86.82
Gardner town.....	8,424	4,983	3,441	68.89
Marblehead town.....	8,202	7,467	735	9.84

d. Decrease.

HISTORY OF MASSACHUSETTS IN BRIEF.—The southeastern part of the State was discovered by Lief Bjornson in 1000-3. The land was first called Vinland from the abundance of wild grapes found there. In 1497 John and Sebastian Cabot again visited the coast. In 1602, Bartholomew Gosnold, with a colony, landed on the coast near Salem and coasted along Cape Cod. In 1603 and in 1605 other vain efforts were made to found permanent settlements. On Sept. 16, 1620, the Plymouth Colonists, 102 in number, sailed from Plymouth, England, and on Nov. 11, 1620 entered what is now Provincetown Harbor, Cape Cod, having, before leaving the ship, organized

a government. After exploring the coast they landed, Dec. 22, at Plymouth, where after enduring many privations, they gathered their first satisfactory harvest in the autumn of 1623. Other colonies were planted in 1623, 1629 and 1630, which later were merged into a larger one. In 1692 all were united under a single governmental administration. A great Indian war, known as King Phillip's war, broke out in 1675. In 1684 the charter was declared forfeited under the decisions of the English courts. In 1692 a new charter was granted and the Plymouth and Massachusetts Bay colonies became united under one government. The first blood of the Revolutionary War was shed at Lexington, April 19, 1775, the battle of Bunker Hill followed on June 17 of the same year. A State constitution was adopted in 1780 and in 1788 the Federal constitution was adopted.

For numerous items of interest relating to Massachusetts see the article UNITED STATES, in these Revisions and Additions.

Progress of the State in Population by decades: In 1790, 378,787; 1800, 422,845; 1810, 472,040; 1820, 523,159; 1830, 610,408; 1840, 737,099; 1850, 994,514; 1860, 1,281,066; 1870, 1,457,351; 1880, 1,763,065; 1890, 2,238,943.

The areas and populations severally of counties in the State in 1890 were as follows; the area being in square miles:

Counties.	Area.	Population.	
		1890.	1880.
Barnstable.....	373	29,172	31,897
Berkshire.....	959	61,108	69,082
Bristol.....	557	186,465	159,040
Dukes.....	124	4,369	4,800
Essex.....	503	299,995	244,535
Franklin.....	665	58,610	86,001
Hampden.....	634	185,713	104,142
Hampshire.....	572	61,359	47,232
Middlesex.....	827	431,167	317,330
Nantucket.....	65	8,268	8,727
Norfolk.....	494	118,950	96,507
Plymouth.....	671	92,700	74,018
Suffolk.....	45	484,780	387,927
Worcester.....	1551	280,787	226,897

The following is a list of the governors of Massachusetts from the beginning, with their dates of service severally:

GOVERNORS OF PLYMOUTH COLONY, ELECTED.

John Carver.....1620-21	William Bradford.....1639-44
William Bradford.....1621-33	Edward Winslow.....1644-45
Edward Winslow.....1633-44	William Bradford.....1645-57
Thomas Prentice.....1634-35	Thomas Prentice.....1657-73
William Bradford.....1635-36	Josiah Winslow.....1673-81
Edward Winslow.....1636-37	Thomas Hinchley.....1681-86
William Bradford.....1637-38	Sir Edmund Andros.....1686-89
Thomas Prentice.....1638-39	Governor-Gen.....1689-92
Thomas Hinchley.....1639-44	

GOVERNORS OF MASSACHUSETTS CHOSEN ANNUALLY UNDER FIRST CHARTER.

John Endicott.....1629-30	John Winthrop.....1646-48
Matthew Cradock (did not serve).....1630-31	John Endicott.....1648-50
John Winthrop.....1630-34	Thomas Dudley.....1650-51
Thomas Dudley.....1634-35	John Endicott.....1651-54
John Haynes.....1635-36	Richard Bellingham.....1654-55
Henry Vane.....1636-37	John Endicott.....1655-65
John Winthrop.....1637-40	Richard Bellingham.....1665-73
Thomas Dudley.....1640-41	John Leverett.....1673-79
Richard Bellingham.....1641-42	Simon Bradstreet.....1679-84
John Winthrop.....1642-44	Joseph Dudley, Pres.....1684-86
John Endicott.....1644-45	Sir Edmund Andros.....1686-89
Thomas Dudley.....1645-46	Governor-Gen.....1689-92
	Thomas Danforth.....1689-92

GOVERNORS APPOINTED BY THE KING UNDER THE SECOND CHARTER.

Sir William Phipps.....1692-94	Jonathan Belcher.....1730-41
William Stoughton.....1694-99	William Shirley.....1741-49
Richard Coote, Earl of Bellamont.....1699-1700	Spencer Phipps.....1749-53
William Stoughton.....1700-1	William Shirley.....1753-56
Joseph Dudley.....1701-2	Spencer Phipps.....1756-57
The Council.....1702-15	The Council.....1757
Joseph Dudley.....1715	Thomas Pownall.....1767-69
William Tailer.....1715-16	Thomas Hutchinson.....1769-69
Samuel Shute.....1716-23	Sir Francis Bernard.....1769-71
	Thomas Hutchinson.....1771-74

GOVERNORS APPOINTED BY THE KING UNDER THE SECOND CHARTER.

William Dummer.....1723-28	Thomas Gage.....1774-75
William Burnett.....1728-30	A Provincial Congress,
William Dummer.....1728-30	The Council.....1774-75
William Tallier.....1730	The Council.....1775-80

GOVERNORS UNDER THE U. S. CONSTITUTION.

John Hancock.....1780-85	John Davis.....1841-43
James Bowdoin.....1785-87	Marcus Morton.....1843-44
John Hancock.....1787-93	George N. Briggs.....1844-51
Samuel Adams.....1793-94	George S. Boutwell.....1851-53
Samuel Adams.....1794-97	John H. Clifford.....1853-54
Increase Sumner.....1797-99	Emory Washburn.....1854-55
Moses Gill.....1799-1800	Henry J. Gardner.....1855-58
Caleb Strong.....1800-07	Nathaniel P. Banks.....1858-61
James Sullivan.....1807-8	John A. Andrew.....1861-68
Levi Lincoln.....1808-9	Alexander H. Bullock.....1868-69
Christopher Gore.....1809-10	William Claflin.....1869-72
Elbridge Gerry.....1810-12	Wm. B. Washburn.....1872-74
Caleb Strong.....1812-16	Thomas Talbot.....1874
John Brooks.....1816-23	William Gaston.....1874-76
William Eastis.....1823-25	Alexander H. Rice.....1876-79
Marcus Morton.....1825	Thomas Talbot.....1879-80
Levi Lincoln.....1825-34	John D. Long.....1880-83
John Davis.....1831-35	Benjamin F. Butler.....1883-84
Samuel T. Armstrong.....1835-36	George D. Robinson.....1884-87
Edward Everett.....1836-40	Oliver Ames.....1887-90
Marcus Morton.....1840-41	John Q. A. Brackett.....1890-91
William E. Russell.....1841-92	

Governor Russell's official term expires Jan. 6, 1892. Salary, \$5,000.

MASSAGE (Fr. "kneading"), the term used in medicine to denote a system of treatment in which the manipulation and exercise of parts ("passive movement") are employed for the relief of morbid conditions. The term is used in an elastic sense, and comprises a variety of forms of treatment extending in the one direction towards the composite gymnastic exercises of Swedish origin, so useful in favoring a sound physical development in children, and in the other towards the jerking and wrenching movements, empirically employed, and familiar in Great Britain under the name of "bonesetting." For the most part, however, massage corresponds to the application of kneading, stroking and rubbing, separately or combined with each other.

Massage is as old as, if not older than, any other form of medical treatment. Hippocrates (800 B. C.), the "Father of Medicine," has left in his writings a description of its application and uses; observing that "it loosens stiff joints and gives tone and strength to those which are relaxed;" further, that "it must be applied with soft hands and in all cases delicately." In the Greek world, and also in the Roman, massage formed a necessary complement to the toilet of the bath; but, apart from the slaves who were specially trained for such duties, there appears to have been a regular profession of "rubbers" competing with and often superseding the physicians of the period. The Chinese and the early races of India seem to have known the value of massage from a remote period, for it is frequently referred to in the ancient writings of both peoples. During the dark ages this method of treatment seems to have fallen into disrepute in Europe; and it is only within the latter half of the 19th century that its practice has been thoroughly reestablished, and that on a scientific basis. It is largely due to Dr. Mæzger, a physician of Amsterdam, that massage has become once more a systematized mode of medical treatment. He began to treat sprains by this method in 1853, and from that time to the present his system has attracted much attention, and has spread widely over the European and American continents.

Two chief methods of application are employed: (1) Stroking, or rubbing with a gliding movement, affecting chiefly the superficial parts (*effleurage*). (2) Pressing, tapping or kneading, affecting chiefly the deeper tissues, and in one locality at a time (*tapotement*). To these may be added an important

combination of the two, viz: (3) Friction with kneading (*petrissage*), in which the tissues are at the same time rubbed longitudinally and squeezed laterally, both superficial and deeper tissues being thereby equally affected. In applying these methods the hand and fingers of the manipulator alone are used. As a rule, if the hands are soft and moist no emollient substance is required, and the best effects are produced without such aid. In all cases the movements follow a direction towards the trunk. In stroking (*effleurage*) the finger-tips pass first lightly over the affected surface, followed by the outspread palm of the hand, which exerts a slightly firmer pressure. In tapping (*tapotement*) the finger-tips, the knuckles, or the edges of the palm are firmly thrust against the affected areas, so as to act chiefly on the deeper tissues, by compressing them firmly against the bony framework of the part. In friction (*petrissage*) the tissues are grasped and raised between the fingers and thumbs, and slightly compressed laterally as well as longitudinally as the manipulator's hands pass upwards over the part. The total time taken up in the application of one of these methods, or in a combination of any of them, should not exceed 20 minutes, and as a rule one such *stance* is sufficient in the 24 hours.

The chief vital effects produced by massage are soothing of pain by reduction of the sensibility of the nerves of the skin; an acceleration in the circulation both of blood and lymph in the parts operated on; and, as a result of this, increased nutrition of healthy tissues and accelerated removal of morbid products. General and local applications of massage are practiced in medicine; the former when some general corporeal effect is aimed at, as in nervous emaciation, narcotic poisoning, and in the treatment of the apparently drowned; the latter, in local injuries, as sprains and bruises, and in local manifestations of constitutional conditions, as rheumatic joint affections, neuralgia, tic, and sciatica. In purely local joint and bone diseases it is, however, as a rule inapplicable and likely to do harm.

MASSEY, GERALD, an English poet born near Tring, Hertfordshire, in 1828. When he was a boy of eight years he worked in a mill, and when he was fifteen he went to London to work. In 1849 he published a weekly newspaper called the "Spirit of Freedom," in company with some fellow workmen. He lectured in many places in Great Britain for the benefit of the working classes, and visited the United States in 1873. His first poem of special merit is the *Ballad of Babe Christabel* (1854). His later works are *Craigcrook Castle*; *Voices of Freedom and Lyrics of Love*; *Shakespeare's Sonnets Never Before Interpreted* (1866), and *A Tale of Eternity*.

MASSILON, a city of Ohio, on four lines of railway and on the Ohio Canal. Population in 1890, 10,068. See *Britannica*, Vol. XV, p. 617.

MASSON, DAVID, a British author, born at Aberdeen, Scotland, Dec. 2, 1822. He was educated at Marischal College of Aberdeen, and at the University of Edinburgh. At 19 he became editor of a Scotch provincial paper, and later joined the literary staff of W. & R. Chambers. In 1847 he settled in London, writing for the reviews, the *Encyclopædia Britannica* and the *English Encyclopedia*. In 1852 he succeeded Clough in the chair of English literature in University College, and held it till his appointment in 1865 as professor of rhetoric and English literature in the University of Edinburgh. Masson edited *Macmillan's Magazine* from 1859 to 1868. His first published work was his *Essays, Biographical and Critical* (1856), reprinted with later essays in 3 vols. (1874-76) entitled respectively

Wordsworth, Shelley and Keats; *The Three Devils—Luther's, Milton's and Goethe's, and Chatterton, A Story of the Year 1770*. His great work is his ponderous *Life of John Milton*, narrated in connection with the *Political, Ecclesiastical and Literary History of his Time* (6 vols. 1859-80), the most complete biography of any Englishman, and of great value for the contemporary history. Other works are *British Novelists and Their Styles* (1859); *Recent British Philosophy* (1865); *Drummond of Hawthornden: The Story of His Life and Writings* (1878); the "Cambridge" edition of *Milton*, with introductions, notes and an essay on Milton's English (3 vols. 1874; new ed. 1890), the "Golden Treasury" edition (2 vols. 1874), and the "Globe" edition (1877). Later works are an excellent study on *De Quincey* (1878) in the "English Men of Letters" series, and a new edition of De Quincey's works in 14 volumes (1880-91). He was Rhind lecturer in 1885, and after 1879 he edited the *Register* of the Privy-council of Scotland, contributing the introductions to the volumes.

MASSORAH, or MASORA ("tradition"), a collection of critical notes on the text of the Old Testament, its divisions, accents, vowels, grammatical forms and letters.

MASTER, an officer in the navy. In recent years the title has been changed to "navigating lieutenant." See *Britannica*, Vol. XVII, p. 293, under NAVIGATING OFFICER.

MASTERWORT (*Peucedanum Ostruthium*), a perennial herb of the natural order *Umbelliferae*, a native of the north of Europe and America. The root has a pungent taste, and often affords relief in toothache. *Astrantia major*, an herb belonging to the same natural order and having similar properties, is also named Masterwort.

MATERIALISM, the theory of the world which professes to find in matter, or in material entities or in material qualities and forces, a complete explanation of all life and existence whatsoever. Early philosophies are generally either theogonies or cosmogonies. Cosmogonies tend to postulate animated or living matter (hylozoism). Out of the earliest hylozoistic philosophies of the Ionic school in Greece arose the atomistic materialism of Leucippus and Democritus, explaining the cosmos as an aggregation and segregation of ultimate indivisible material entities or atoms. The atomic theory of Democritus became the basis of the sensationalistic psychology and ethics of Epicurus, and was transmitted in the going verses of Lucretius' great didactic poem, *De Rerum Natura*, on to the later Roman period. Materialism as a basis for scientific research we find revived in history wherever a movement arose in favor of the methods and aims of experimental or natural science, as in the Renaissance period in Europe generally. Gasendi, though, it is who must be regarded as the renewer *par excellence*, in modern times, of systematic materialism. He developed the doctrine of Democritus, by endowing the atoms with force and even with sensation. Lamettrie, by his materialistic account of the functions of the mind, prepared the way in France for the comprehensive materialism of Baron Holbach, whose *Système de la Nature* is the *chef-d'œuvre* of French materialism. In Holbach materialism reaches its high-water mark. Applying materialism to anthropology, he seeks to show that man is only a physical being, and that morality or virtue is independent of the supports of positive religion and of theism.

The empirical method of Bacon and Locke, taken along with some thing Locke said about matter being possibly made to think, and eagerly caught up by men like Voltaire, had countenanced in Eng-

land as well as in France a materialistic treatment of the mental and spiritual powers of man, as in the works of Hobbes, Hartley and Priestly. In Germany philosophy was in the main idealistic and speculative until the death of Hegel, but Vogt about 1850 applied the principles of materialism to psychology, holding that physiology pronounced definitely and categorically against the idea of individual immortality, as indeed all notions founded on the idea of the independent existence of the soul. Moleschott and Büchner are associated with Vogt as upholders of materialism. Büchner's *Kraft und Stoff* ("Force and Matter") is the Bible of German materialism. Feuerbach and Strauss may be mentioned as philosophers who exchanged the spiritualistic monism of Hegel for materialistic monism.

The form in which materialism now appears has been determined by the doctrine of evolution. Materialism indeed might be said to have been absorbed in the wider theory of evolution, which goes beyond the mere antitheism or atheism of materialism, and seeks positively to show how the diversities and differences in the world can be accounted for by natural as opposed to supernatural or creative process. Haeckel is perhaps the most prominent upholder of the Darwinian hypothesis on the Continent.

Materialism may be examined from many points of view. (1) Materialism is scientific realism. It believes in real physical entities, such as atoms and forces, and spaces and times. Now a belief in atoms leads, in physics, in chemistry, and in astronomy, to insoluble contradictions; atoms for example, for physical purposes must be at once absolutely impenetrable and unalterable, and yet absolutely elastic and alterable. It would be more correct, to reduce matter to forces than to atoms, as many theorists have done. But it is difficult to think of forces existing without some sort of substrate. Spaces and times too are not physical things. Thus science is full of hypotheses; nor can it dispense with hypotheses. Complete physical realism or materialism is, in short, theoretically impossible. (2) Even granting—which in strictness we cannot—the existence of "mere matter," science has as yet found insuperable difficulty in passing from unorganized to organized matter. (3) Psychology has as yet been unable to regard organic state as accounting for physical or mental states. The two are totally different, and, though correlated, cannot be said to be causally connected. (4) Materialism cannot furnish a complete or consistent ethical theory. If a man is entirely the product of natural forces, and in fact the sport of natural forces, it is meaningless to think or speak of him as morally obliged either to follow or to resist nature. Man not only follows and resists nature, but in mechanical and artistic construction commands and anticipates and surpasses nature. Of course to materialism the belief in human freedom, which practically makes history, is an illusion, but it is difficult to see how on the materialistic hypothesis even this illusory belief could have arisen. (5) Although materialistic evolution may succeed in showing that we ought not to regard certain natural adaptations and productions as special and final creations, it cannot and does not avoid the question of teleology. Neither hylozoism nor mechanism, nor unconscious selection and adaptation accounts for that relativity to everything, which is really what at bottom is meant by teleology. There must be a world-soul or world-thought for whom the universe is realized end. (6) There is the philosophical question about mere matter. It has again and again been

confessed by scientists as well as by philosophers that by matter can only, in the last resort, be meant what J. S. Mill calls the permanent possibility of sensation. There is in fact no object (or objective thing) without a subject (or consciousness). If the materialist at once replies that there is no subject without an object, he is in the right as against the thesis. The idealist, in short, and the materialist are in the right as against each other. Subject and object imply each other. We cannot begin with either in order to explain from it the other.

Materialism brings prominently before us that side of the universe which is compassed by the methods of physical science. But physical science like economic or theological or mental science, takes a one-sided or "abstract" view of experience. All sciences "abstract" from the concrete whole of experience certain facts which they propose to investigate in detail. Physicists, like metaphysicians and theologians, are apt to become dogmatical about spheres of inquiry of which they know professedly nothing.

MATERIA MEDICA, that department of the science of medicine which treats of the materials employed for the alleviation and cure of disease, their properties, physiological actions, and uses.

MATHEMATICIANS (Lat. *mathematici*), the name given by the Romans to the professors of astrology, from the fact that those who practiced astrology to some extent cultivated mathematical science. The Romans, unlike the Greeks, appeared not to comprehend the attractions of mathematical studies, and, being unable to distinguish between the student of pure science and the fanatic enthusiast who attempted to derive knowledge of future events on this earth from the position of the stars, joined them together in a common condemnation under the name of "mathematici."

MATSUMA, a seaport of Japan, situated at the southwest extremity of the Island of Yesso, at the western entrance to the Strait of Tsugaru. Formerly the principal town of the island, it has in recent times been outstripped by Hakodate. Population in 1887, 31,037.

MATTEAWAN, a post-village of Dutchess county, N. Y., on Fishkill Creek, $1\frac{1}{2}$ miles above Fishkill Landing. Here felt goods, hats, lawn-mowers, wood-working machinery and files are manufactured.

MATTHEWS, STANLEY, an American statesman and jurist, born in Cincinnati, July 21, 1824, died in 1889. He practiced law for a time in Tennessee; and in 1846 became assistant editor of the Cincinnati "Herald." He held various important judicial offices, and commanded a brigade in the early part of the civil war. He was elected United States Senator in 1877, and became associate judge of the Supreme Court in 1881.

MATTHIAS (1790-1840), a religious impostor. He was a country merchant in Washington county, N. Y., named Robert Matthews, and after failing in business he removed to Albany in 1827. Claiming to have received a revelation he took to street-preaching. He failed to convert Albany, prophesied its destruction, and removed to New York City, where he involved several respectable families in his delusions. He was finally exposed, and his followers then dispersed.

MATTISON, HIRAM, an American clergyman and educator, born at Norway, N. Y., in 1811, died in 1868. He became a Methodist preacher in 1836; filled important pulpits in New York City from 1852 to 1861; withdrew from the M. E. church on account of slavery, but returned to it in 1868 and

became secretary of the American and Foreign Christian Union. He was author of *The Doctrine of the Trinity*, *Astronomy*, *Spirit-Rappings*, *Resurrection of the Body*, and was editor of Burritt's *Geography of the Heavens*.

MATTO GROSSO ("dense forest"), an inland state of Brazil, bordering on Bolivia. Within this vast territory several great rivers rise, including the Madeira and Paragua. The vegetation is generally scanty, high trees and rich vegetation being confined to the river valleys. The gold and diamonds of Matto Grosso have been exhausted, and agriculture (insufficient for the wants of the state) and cattle raising are the principal industries. The former capital, Matto Grosso, decayed with the gold-mining industry. See *Britannica*, Vol. IV, pp. 234, 235.

MATTOON, a city of Illinois. Population in 1890, 6,829. See *Britannica*, Vol. XV, p. 635.

MAUCH CHUNK, a mining town, the county seat of Carbon county, Pa., situated among picturesque hills on the Lehigh River, ninety miles by rail north-northwest of Philadelphia. There is a switchback railway, nine miles long, from the town to Summit Hill—a place famous for its 'burning mines,' which have been on fire since 1858. Population in 1890, 4,098.

MAUCHLINE, a town of Ayrshire, twelve miles from Ayr, and ten miles from Kilmarnock. Here is a monument (1830) to five martyred Covenanters; one mile north is Mossiel, Burn's farm from 1784 till 1788, and in the village itself the scene of his *Jolly Beggars* and of his *Holy Fair*.

MAUDSLEY, HENRY, an English student of mental pathology, born near Giggleswick, Feb. 5, 1835, and educated at University College, London. He was for a time physician to the Manchester Royal Lunatic Asylum, but returned to London in 1862 to be a consulting physician. From 1869 to 1879 he filled the chair of medical jurisprudence at University College. His works are *The Physiology and Pathology of the Mind*; *Responsibility in Mental Disease*; *Body and Will*, and *Natural Causes and Supernatural Seemings*.

MAUNDER, SAMUEL, an English compiler, born about 1790, died April 30, 1849. He was a brother-in-law of Samuel Pinnock, assisted him in the preparation of his catechisms and amongst other works which he compiled are *Biographical Treasury*; *Scientific and Literary Treasury*; *Treasury of Knowledge*, and *Treasury of History*.

MAUPASSANT, GUY DE, a clever French writer, born August 5, 1850, at the castle of Miromesnil in Normandy. After carrying a musket through the Franco-German war, he was initiated by Gustave Flaubert into the craft of letters. He attached himself to the younger branch of the naturalistic school, and wrote himself in by a story contributed to the *Soirées de Médan*. He next produced a play and a striking volume of lyrics. But he won his real reputation as a novelist and storyteller, with *La Maison Tellier*; *Les Soeurs Rondoli*; *Contes du Jour*; *Contes et Nouvelles*; *Monsieur Parent*; *Bel-Ami*; *La Petite Roque*, *Pierre et Jean*, and *Fort comme la Mort*.

MAUREPAS, JEAN FRÉDÉRIC PHÉLYPEAUX (1701-1781), a French statesman. When 14 years of age he was appointed minister of marine, and in 1738 became minister of state. In 1774 he was made minister of the council.

MAURER, KONRAD VON, a German archæologist, born at Frankenthal, in Rhenish Bavaria, in 1823. After being educated at Munich, Leipzig, and Berlin, he was in 1847 made professor of jurisprudence at Heidelberg. He has devoted a great deal of time and study to the early Scandinavian history,

laws, languages and literature. He has published *Die Entstehung des isländischen Staats und seiner Verfassung; Die Bekehrung des norwegischen Stammes zum Christenthum* (2 vols.), and has edited *Isländische Volksagen* (1860).

MAVROCORDATOS, ALEXANDER, a Greek statesman, born at Constantinople in 1791, died at Aegina in 1865. He took a prominent part in the struggle for the independence of Greece, presided in the first national assembly, and was afterwards distinguished as a general. When Otho was made king of Greece, he was several times prime minister, and also ambassador to Prussia, England and France, holding the latter post 1850-54. Towards the close of his life he lost his sight.

MAW-SEED, a name by which the seed of the opium poppy is sold as food for cage-birds when moulting.

MAUSOLEUM, a sepulchral monument of large size, containing a chamber in which urns or coffins are deposited. The name is derived from the tomb erected at Halicarnassus to Mausolus, king of Caria, by his widow, Artemisia, in 353 B. C. (See **HALICARNASSUS**, Britannica, Vol. XI, pp. 383, 384.) It was esteemed one of the seven wonders of the world. Although apparently in good condition as late as the 12th century, it fell into decay during the following two centuries. The ruins were ransacked for building materials by the Knights of St. John in the 16th century. The site was re-discovered in 1857 by Newton, who was instrumental in getting the remains carried to the British Museum. The mausoleum consisted of a basement 65 feet high, on which stood an Ionic colonnade 23½ feet high, surmounted by a pyramid, rising in steps to a similar height, and on the apex of that stood a colossal group, about 14 feet in height, of Mausolus and his wife in the *quadriga*; these statues are supposed to have been the work of the celebrated Scopas. Later instances of large and magnificent mausoleums are Metella's tomb, Hadrian's (Castle of San Angelo) and that of Augustus at Rome, the mausoleum of Frederick William III. and Queen Louisa at Charlottenburg near Berlin, that of the House of Hanover at Herrenhausen, of the Prince Consort at Frogmore in Windsor Park, of Napoleon III. at Farnborough and of A. T. Stewart at Garden City, Long Island, N. Y., in the United States. The neighborhood of San Francisco is studded with the mausoleums of American millionaires, one instance being the Lick observatory; while magnificent structures mark the burial-places of such prominent men as Lincoln, Grant and Garfield.

MAUSTON, a post-village, the county-seat of Juneau county, Wis., 124 miles west of Milwaukee. It has excellent schools, good water-power, and manufactures lumber, barrels and carriages.

MAX-MÜLLER, FRIEDRICH, philologist, born at Dessau, Dec. 6, 1823. His father, Wilhelm Müller, was librarian of the ducal library, but died prematurely in 1827. Max-Müller received the elements of his education at Dessau, and then went to Leipzig, where he studied Greek and Latin and took his degree in 1843. He began the study of Sanskrit and chose it as his special pursuit. The first fruits of his labors appeared in a translation of the *Hito padesa*. In 1844 he went to Berlin to study and to consult the Sanskrit MSS. to be found there. In Paris, whither he repaired in 1845, he began to prepare for an edition of the Rig-Veda, with the commentary of Śāyanaçārya. With this view he went

to England in 1846, to examine the MSS. in the East India House, London, and the Bodleian Library at Oxford. The East India Company commissioned him to edit the Rig-Veda at their expense. In 1850 Max-Müller was appointed professor of modern languages at Oxford; and in 1858 he was elected a Fellow of All Souls. While pursuing his labors connected with the Rig-Veda, Max-Müller has published treatises on a variety of philological topics, which have done more than the labors of any other single scholar to awaken a taste for the science of language in its modern sense. He has at command such a felicity of illustration that subjects dry under ordinary treatment become in his hands attractive. He is one of the eight foreign members of the Institute of France, and one of the twenty knights of the Ordre pour le Mérite. He has received the degree of LL. D. from Cambridge, Edinburgh and Bologna.

MAY, SAMUEL JOSEPH (1797-1871), an American reformer. In 1822 he became pastor of a Unitarian church in Brooklyn, N. Y., and from 1836 to 1842 had charge of the church at South Scituate, Mass. From 1845 to 1868 he was pastor of the Unitarian society in Syracuse, N. Y. He was early interested in the anti-slavery cause, and wrote and preached on the subject. He published *Education of the Faculties* (1846); *Revival of Education* (1855), and *Recollections of the Anti-Slavery Conflict* (1868).

MAY, SIR THOMAS ERSKINE (1815-1866), assistant-librarian of the House of Commons in 1831, and clerk of the House in 1871. He was called to the bar in 1838, was made in 1860 Companion, and in 1866 Knight Commander of the Bath, and shortly after his retirement from office in 1866 was raised to the peerage as Baron Farnborough, but died May 18 of that year. His most important works are *A Treatise on the Law, Privileges, Proceedings, and Usage of Parliament*; *Constitutional History of England since the Accession of George III*; and *Democracy in Europe*.

MAYAS, a race of Yucatan Indians, supposed to be the descendants of those civilized nations who built Uxmal, Chichen, Itza, Copan, Palenque, and other towns and temples in Yucatan which have excited the admiration of archaeologists in a high degree. Some of the latter think that the Mayas have originated from the Toltecs, who were driven from the table-land of Mexico by the Aztecs in the 11th or 12th century, A. D. They were Christianized in the latter half of the 16th century, and led the lives of peaceful and loyal agriculturists until the year of 1848. At that time there was a terrible outbreak in Southern Yucatan. The Mexican rule was overthrown, hundreds of white citizens of Spanish descent were massacred, and several flourishing towns laid in ashes. The Mayas have asserted and since then maintained their independence, carrying on an often repeated warfare with the frontier settlements. They are, however, on friendly terms with the English settlers of Belize, from whom they obtain arms and ammunition. See **BRITANNICA**, Vols. XII, p. 828; XVI, p. 208; XXIV, p. 758.

MAYER, ALFRED MARSHALL, an American physicist, born in 1836. In 1856 he was made professor of physics and chemistry in the University of Maryland, and from 1859 to 1861 held a similar position in Westminster College, Mo. He afterwards held professorships in Pennsylvania College, and Lehigh University, until 1871 when he accepted the professorship of physics in the Stevens institute of technology, Hoboken, N. J. Besides numerous contributions to cyclopædias and journals, he has published *Lecture Notes on Physics* (1863); *The Earth a Great Magnet* (1872); *Light* (1877); *Sound* (1878);



MAUSOLEUM.

and *Sport with Gun and Roam in American Woods and Waters* (1888).

MAYER, BRANTZ (1809-1879), an American author. He was admitted to the Maryland bar in 1829, and in 1843 was appointed secretary of legation to Mexico. In 1863 he became a paymaster in the United States army, and served until 1871 when he retired with the rank of colonel. He wrote *Mexico as it Was, and as it Is* (1844); *Mexico, Aztec, Spanish, and Republican* (1851); *Captain Canot, or Twenty Years of an African Slave* (1854); *Observations on Mexican History and Archaeology* (1856); *Mexican Antiquities* (1858); *Memoir of Jared Sparks* (1867); and *Baltimore as it Was, and as it Is* (1871).

MAYFIELD, a city, the county-seat of Graves county, Ky., on Mayfield Creek, twenty-six miles south of Paducah. It has tobacco houses and manufactures flour and woolen goods.

MAYHEW, AUGUSTUS (1826-1875), an English author, wrote in conjunction with his brother Henry ("the Brothers Mayhew") several notable works of humorous fiction. In addition he wrote several stories which were popular at the time.

MAYHEW, EXPERIENCE (1673-1758), an American missionary, great-grandson of Thomas Mayhew. He had charge of several Indian congregations, and translated the Psalms and the Gospel of John into their language. He also wrote *Indian Converts* (1727), and *Grace Defended* (1744).

MAYHEW, HENRY, an English journalist and litterateur, born in London in 1812. He ran away from Westminster school, was sent on a voyage to Calcutta, and on returning was article to his father, a solicitor. Mayhew's first adventure in literature was the starting, in conjunction with Gilbert a Beckett, of *The Cerberus*, the production of which was stopped by a Beckett's father. The two youths in disgust left their homes, and with but fifteen shillings between them walked to Edinburgh, hoping to make fortunes there as actors and authors at the theatre of which Mayhew's brother Edward was lessee; this failed, for they were at once sent back. In 1831 they started *Figaro in London*, and the year following *The Thief*, which was the prototype of the "Bits" journals of to-day. In 1841 Mayhew produced *The wandering Minstrel*, a farce, and shortly after joined with his brother Augustus in one of the most successful of literary partnerships, during which (as "the Brothers Mayhew"), they produced some remarkably clever works of fiction. One of the originators and first editor of "Punch," Mayhew was from early in the forties a voluminous writer on many subjects. His brother Horace (1816-72), also made some mark in literature, more especially of a humorous and ephemeral kind. He was a constant contributor to "Punch," of which he was at one time sub-editor. He died in 1887.

MAYHEW, JONATHAN (1720-1766), an American clergyman, son of Experience Mayhew. From 1747 till his death he was pastor of the West church in Boston, Mass. From his youth he pleaded fervently in behalf of colonial freedom in church and state from the English oppression. He published *Seven Sermons* (1749); *Discourse Concerning Unlimited Submission and Non-Resistance to the higher Powers* (1750); *Sermons* (1751), and *Sermons on Young Men* (1767).

MAYHEW, THOMAS (1592-1682), a governor of Martha's Vineyard. He was for some time an English merchant, but having obtained a grant of a large portion of Martha's Vineyard, with the title of governor, emigrated in 1641 to Massachusetts, and the following year settled in Edgartown, where he organized a mission to convert the Indians. His

influence among the natives became so great that during King Philip's war they took no part in the conflict.

MAYO, AMORY DWIGHT, an American clergyman, born in 1823. From 1846 to 1854, he was pastor of the Independent Christian church at Gloucester, Mass., of a church in Cleveland, Ohio, from 1854 to 1856, and then till 1879 of Unitarian churches in Albany, N. Y., Cincinnati, Ohio, and Springfield, Mass. He has since been engaged in educational work in the southern States. He has published *The Balance* (1847); *Graces and Powers of the Christian Life* (1850); *Symbols of the Capital* (1859); *Religion in Common Schools* (1869), and *Talks With Teachers* (1878).

MAYO, WILLIAM STARBUCK, an American author, born in 1812. He practiced medicine in Ogdensburg, N. Y., for several years, and then settled in New York City, to devote himself to literature. He is author of *Flood and Field, or Tales of Battles on Sea and Land* (1844); *Kaloolah, or Journeyings to the Ejebel Kumri* (1849); *The Berber, or the Mountaineer of the Atlas* (1850); *Romance Dust from the Historic Placer* (1851), and *Never Again* (1873).

MAYSVILLE, a city of Kentucky, the river port of a rich territory. It contains some flour and lumber mills, distilleries, car shops, etc. Population in 1890, 5,350. See *Britannica*, Vol. XV, p. 651.

MAZARRON, or ALMAZARRON, a seaport town of Spain, twenty-seven miles from Cartagena. Population, 11,002.

MAZURKA, a lively Polish dance, the music of which is $\frac{3}{4}$ time with a strong accent on the second beat. It is danced by four or eight couples, and is much practiced in the south of Germany and in Poland, from whose province Mazovia it gets its name.

MAZZARINO, a town of Sicily, fifteen miles southeast of Caltanissetta. Population, 12,964.

MEAD, LARKIN GOLDSMITH, an American sculptor, born in 1835. He displayed talent for modeling at an early age, and in 1855 produced the *Recording Angel*. After completing several other works he went to Florence, Italy, where he has since resided. He has modeled numerous statues, and the groups *The Returned Soldier*; *Columbus's Last Appeal to Queen Isabella*; *America*; *Venice, the Bride of the Sea*; *The Discovery of America*; *Cavalry*; *Infantry*; *Artillery*, and *Navy*.

MEADE, GEORGE GORDON (1815-1872), an American soldier. See *Britannica*, Vol. XXIII, p. 790.

MEADE, RICHARD KIDDER (1795-1862), an American politician, William Meade's brother. He began the practice of law in Petersburg, Va., and from 1847 to 1853, was a member of Congress. From 1857 to 1861, he was United States minister to Brazil.

MEADE, RICHARD WORSAM (1807-1870), a United States naval officer, brother of George Gordon Meade. He entered the navy in 1826 as midshipman, became lieutenant in 1837, commander in 1855, and captain in 1862. He was retired in 1867 with the rank of commodore. In 1861 he was given command of the receiving-ship "North Carolina," and in 1864 of the steam sloop-of-war "San Jacinto."

MEADE, RICHARD WORSAM, a United States naval officer, son of the preceding, born in 1837. He entered the navy as midshipman in 1850, and was promoted lieutenant in 1858, lieutenant-commander in 1862, commander in 1868, and captain in 1880. During the civil war he served with distinction on the Mississippi River, and in the South Atlantic and Western Gulf blockading squadrons.

MEADE, WILLIAM (1789-1862), an American Protestant Episcopal bishop. He was made deacon in 1811, and ordained priest three years later. In

1811 he became deacon of Christ church, Alexandria, Va., and in 1813 went to Millwood, where he remained till 1829, then becoming assistant to Bishop Richard Channing Moore. In 1841 he succeeded Dr. Moore as bishop of Virginia. He wrote *Family Prayers* (1834); *Pastoral Letters on the Duty of Affording Religious Instruction to those in Bondage* (1834); *Companion to the Font and to the Pulpit* (1846); *Lectures on the Pastoral Office* (1849); *Reasons for Loving the Episcopal Church* (1852); *Old Church Ministers, and Families of Virginia* (1857); and *The Bible and the Classics* (1861).

MEADVILLE, a city, the county-seat of Crawford county, Pa. Population in 1890, 9,502. See Britannica, Vol. XV, pp. 656-57.

MEAGHER, THOMAS FRANCIS (1823-1867), an Irish-American soldier. From 1843 he devoted himself to the cause of Ireland, and in 1848 was arrested and sentenced to death on the charge of treason. The sentence was afterward commuted to banishment, and he was transported

to Van Diemen's Land, but in 1852 he escaped to the United States. At the beginning of the civil war he organized the "Irish brigade," and was chosen its brigadier-general. He was afterwards made brigadier-general of volunteers. In 1865 he became secretary of Montana, and the following year while acting as governor *pro tempore* he fell into the Missouri River and was drowned. He was the author of *Speeches on the Legislative Independence of Ireland* (1852).

MEASLES. See Britannica, Vol. XV, pp. 657-8.

MEATS. The production of meats is a subject of special American interest because it is growing to be one of the most important industries of this country. In the following table we give the yearly production of beef, mutton, pork, and fowl in the most important European countries, as well as in the United States and Canada, for 1880 (the census figures for 1890, have not yet been published at the time of going to press). The figures are here given in thousands of tons.

A.—PRODUCTION AND CONSUMPTION OF MEATS.

Countries.	Production, Thousands of Tons.					Consumption, Tons, Thousands.
	Beef.	Mutton.	Pork.	Fowl, etc.	Total.	
United Kingdom.....	666	346	145	28	1,195	1,640
France.....	550	210	240	60	1,060	1,210
Germany.....	785	230	285	45	1,345	1,405
Russia.....	1,050	420	445	50	1,965	1,920
Austria.....	655	180	275	40	1,150	1,090
Italy.....	165	70	55	25	315	295
Spain and Portugal.....	170	180	130	10	490	460
Belgium.....	82	6	24	6	118	190
Holland.....	95	9	12	5	121	98
Denmark.....	80	18	16	2	116	76
Sweden and Norway.....	150	27	18	6	201	196
Greece.....	12	15	1	1	29	31
Roumania, etc.....	160	50	60	10	280	303
Europe.....	4,620	1,761	1,706	298	8,385	8,911
United States.....	1,750	340	1,420	60	3,570	3,060
Canada.....	135	36	45	5	221	198
Total.....	6,505	2,137	3,171	363	12,176	12,169

The following table gives the yearly consumption of beef, mutton, pork, and fowl per inhabitant in pounds.

B—MEAT CONSUMPTION PER INHABITANT.

Countries.	Per Annum, Lbs.				
	Beef.	Mutton.	Pork.	Fowl, etc.	Total.
United Kingdom.....	52	24	26	3	105
France.....	40	12	19	3	74
Germany.....	40	12	15	2	69
Russia.....	24	11	11	2	48
Austria.....	37	10	15	2	64
Italy.....	12	5	4	2	23
Spain and Portugal.....	16	18	14	2	49
Belgium.....	44	3	27	2	76
Holland.....	42	5	7	2	56
Denmark.....	31	19	17	2	69
Sweden and Norway.....	48	9	6	2	65
Europe.....	32	12	11	2	57
United States.....	62	14	41	3	120
Canada.....	52	17	21	3	93

In table C the export of bacon, beef, live cattle, and pork is given for the years 1861, 1871, and 1881, live cattle being computed at 560 pounds per head.

C—MEAT EXPORTS OF THE UNITED STATES.

	Tons.		
	1861.	1871.	1881.
Bacon.....	22,400	32,300	336,400
Beef.....	6,400	19,890	68,100
Cattle.....	3,300	11,900	26,200
Pork.....	8,300	18,100	49,500
Total.....	40,400	82,100	510,200

MECHANIC FALLS, or MECHANIC'S FALLS, a post-village of Androscoggin county, Me., thirty-three miles north of Portland. Paper, rifles, shoes, cheese, harness, organs, and furniture are manufactured here. There is also a corn-canning establishment.

MECHANICSBURG, a post-village of Champaign county, Ohio, seventeen miles northwest of Springfield.

MECHANICSBURG, a post-borough of Cumberland county, Pa., eight miles west of Harrisburg. It contains a foundry, spoke and bending works, door and sash factories, Irving Female College, and Cumberland Valley Institute. Population, 3,690.

MECHANICSVILLE, a post-village and a railroad junction of Saratoga county, N. Y., eighteen miles northeast of Schenectady. It manufactures linen thread.

MEDEAH, a town of Algeria, forty miles southwest of Algiers. It is supplied with water by means of an aqueduct. Population, 3,620.

MEDIATE, in the old German Empire, a term applied to those possessions which were held by feudal tenure under one of the greater vassals, and so only *mediately* under the emperor as the supreme feudal lord.

MEDIATOR, a term applicable to any person who endeavors to reconcile parties at variance. In theology, it is employed to denote Christ, both with respect to his sacrifice of *Atonement*, and to his continual intercession.

MEDICAL ASSOCIATION, AMERICAN. The number of physicians belonging to the school represented by this organization in 1890 is estimated at 75,000. It comprises 100 medical colleges, 1,800 professors and instructors, and about 10,000 students in attendance in the colleges. About 3,000 of the latter received the degree of M. D. in 1890. The president of the association is Dr. William T. Briggs, of Tennessee, and the permanent secretary is Dr. William B. Atkinson, of Philadelphia, Pa. The colleges had libraries equalling 45,000 volumes. Their buildings, lands, and scientific apparatus amounted to three millions of dollars in value.

Forty States have State medical societies. The American Medical Association, the parent body, so to speak, has a membership of over 5,000. In addition, there are a number of special organizations, such as the American Academy of Medicine, composed only of medical graduates who have received a degree in letters prior to graduation; membership, about 500; American Association for the Study and Cure of Inebriates, American Cli-

matological Association, American Dermatological Association, American Gynecological Association, American Laryngological Association, American Neurological Association, American Ophthalmological Association, American Otological Association, American Association of Pediatrics, and American Public Health Association.

In many of the States the county medical societies alone are represented in the State body, but in others, particularly those of the West, the counties are poorly organized, and the State body is made up independently. The aggregate membership of these State societies at present is not far from 40,000. The aggregate number of county and district medical societies is 650. All these are in association with and entitled to send delegates to the American Medical Association. The number of hospitals, whether attached to colleges or otherwise, is about 720.

MEDICAL COLLEGES OF THE UNITED STATES. There are at present (1891) over 100 medical schools in active operation in the United States, with about 1,800 professors. To this number we must add 10 colleges of eclectic and 13 of homeopathic medicine, 18 dental, and 17 pharmaceutical colleges, making a total of 148. In 1885 the number of professors in all the medical schools (as returned by commissioner of education) was 2,235; of students, 15,300; and of graduates, 4,617.

The following list gives the most notable of the medical colleges in the United States in the order in which they have been organized:

It must be remarked here, that Philadelphia, the seat of the first medical college in the United States, is also the seat of the first Woman's Medical College. After Philadelphia come Boston, New

Medical Colleges.	Founded.	Professors.	Graduates.
Medical Department of the University of Pennsylvania, Philadelphia.....	1765	53	101
Harvard Medical School, Boston.....	1782	52	59
College of Physicians and Surgeons, New York.....	1807	58	115
School of Medicine of the University of Maryland.....	1807	19	17
Medical College of Ohio.....	1819	13	100
Jefferson Medical College, Philadelphia.....	1825	19	215
Medical Department of the University of Virginia.....	1825	15	14
Medical Department of the University of Louisville.....	1825	13	84
Medical Department of the University of the City of New York.....	1837	27	213
Missouri Medical College, St. Louis.....	1840	18	103
Rush Medical College, Chicago.....	1843	87	166
Woman's Medical College of Pennsylvania, Philadelphia.....	1840	15	26
Cincinnati College of Medicine and Surgery.....	1851	14	14
New England Female Medical College, Boston.....	1756	28	149
Bellevue Hospital Medical College, New York.....	1861	23	14
Woman's Medical College of New York Infirmary.....	1861	28	149
College of Physicians and Surgeons, Baltimore.....	1868	20	9
Woman's Medical College of Chicago.....	1872	10	127
Woman's Medical College of Baltimore.....	1870	23	21
	1882	17	5

York, Chicago, and Baltimore in establishing colleges for women.

Of the now existing homeopathic schools in the United States the first one, in point of time, is the "Hahnemann Medical College of Philadelphia." It was founded by Dr. Constantine Hering, and incorporated in 1848 as the "Homeopathic Medical of Pennsylvania." The first class consisted of 15 students. In 1867 a rival institution was organized, entitled the "Hahnemann Medical College of Philadelphia." These two schools were combined in 1869, retaining the name of the latter, but working under the charter of the former. Since that time the college has been prosperous. It graduated 1,648 students up to 1886.

A third school of medicine in America is the "Eclectic." It claims to adopt all that is of proved

value in either of the other two systems, and to hold itself free to vary in accordance with every new discovery. To this it adds the employment of "specifics" which are nearly always from the vegetable kingdom, and are directed to special pathological conditions, on the principle that certain diseases generate similar morbid products which may be excreted from the system by the use of these "specifics." The first regular Eclectic school was instituted at Cincinnati in 1843, under the title of the "Eclectic Medical Institute." Up to 1875 this school had matriculated 5,375 students and graduated 1,804. In 1882 it had 8 professors and 272 students, of whom 100 graduated. In 1866 followed the establishment of the Eclectic Medical College of the City of New York with 9 professors, and in 1878 that of the United States Medical College of

New York, with 13 professors. Similar colleges exist now in Chicago, St. Louis, Atlanta and Oakland, Cal. In the year 1886 the Eclectic system had in all about 100 professors and on an average of 312 graduates per annum. Yet eclecticism cannot be said to be in a very flourishing condition.

The best-known homeopathic colleges of the United States, are the following, with dates of their organization, up to 1876:

Colleges.	Organized.
Hahnemann Medical College of Philadelphia	1848
Cleveland Homeopathic Hospital College	1849
Pennsylvania Medical University, Philadelphia	1853
Hahnemann Medical College of Chicago	1855
Homeopathic Medical College of St. Louis, Mo.	1858
New York Homeopathic Medical College	1860
New York Homeopathic Medical College for Women	1863
Boston University School of Medicine	1869
Homeopathic Medical College of Detroit	1871
Pulte Medical College, Cincinnati	1872
Homeopathic Medical College of the University of Michigan	1875
Chicago Homeopathic College	1876

The great drawback of many of the medical colleges is the fact that they cannot give any valuable clinical instructions, because they have no access to the large hospitals, only those of the largest cities being connected with such hospitals. Many of them draw students by low prices and easy examinations. These inducements, together with the desire of many young Americans to become doctors at little cost of money, time, and study, has forced some of the best medical schools to make their courses less thorough and their examinations comparatively easy; for they have to compete with the third-rate colleges for patronage and their existence depends on the public patronage. The consequence is that the United States have now more physicians in proportion to the population than any other country in the world. In 1880 there was one physician for every 584 inhabitants. The first-class medical colleges, as those in New York, Philadelphia and Boston, have instituted a three years' course of study. But the majority of these colleges throughout the country have only a two years' course of about twenty weeks' duration each.

MEDICAL TREATMENT, SPECIAL METHODS OF. In this article we do not refer to the standard (allopathic) and the homeopathic and eclectic medical treatments, but to some of those popular methods with which many of the educated physicians will have nothing to do, such as water cure, oxygen treatment, electrical applications, massage, etc.

WATER-CURE (Hydropathy) consists in using water at different temperatures and in various forms, as having it doused in solid streams, from a height, being wrapped in wet sheets, and so rubbed, taking clisters of tepid water, putting the feet first into cold, then into hot water, etc. It is credited with reducing local or general inflammation, and stimulating relaxed or enfeebled tissue. The "steam-bath" produces sweating and assists in depurification, but it also debilitates the system.

AIR-CURE consists in inclosing the body up to the neck in a compartment filled with compressed air, and also in inhaling various gases or medicated vapors. The vacuum treatment is the inclosing of a limb or the body in an air-tight box from which the air has been exhausted. This expands the vessels, makes the capillaries wider, and forces more blood into the parts so inclosed.

The compressed air treatment acts in the opposite way. Both methods are used in paralysis, rheumatism, antrhophy, etc.

OXYGEN TREATMENT is the inhalation of oxygen, pure, or combined with air, or with nitrous oxide (laughing gas). Oxygen inhalations are for stimulating respiration and for purifying the blood; and the nitrous oxide is used as an anæsthetic, mostly for the purpose of suspending pain.

ELECTRICAL TREATMENT may be galvanic, faradic, or franklinic. A galvanic current can be used for cauterizing, if we make a platinum wire red hot and apply this to the tissue which is to be burnt away. Applied to the principal nerve leading to a muscle, the current causes a powerful contraction of that muscle. It is used to stimulate the nerves of the special senses and in various other ways. The faradic or induced current is alternating. It passes through the secondary circuit of an induction coil. Wherever it is applied it produces local heat. It is often used in rheumatism, paralysis, dyspepsia, and similar diseases. Franklinic or static electricity is now little used.

MOVEMENT-CURE.—The claim is made that exercising the shoulders and arms arrests cough and lung disorders. Movements about the waist and abdomen help the stomach and bowels. Movements about the joints reduce stiffness, swelling, and deposits by increasing the activity of the absorbents. Nerve affections are relieved by muscular exercise, because they are mostly produced by congestion, and the muscular action draws the blood supply away from the nerves by causing a greater demand in the exercised muscles. Lung congestion is relieved by vibrating the extended arms by two attendants, the surcharge of blood being drained off to meet the call of the agitated arms. The peristaltic action of the bowels is promoted by kneading and percussion of the liver. Machinery is often employed to give a great variety of movement and vibrations in the parts of our body, and it is claimed that in producing heat and due changes, these movements are much more effective than hand movements alone.

LIFT-CURE is a single movement. The lifter stands with spine erect, but the knees bent 3 or 4 inches, upon a platform resting upon spiral springs, and grasps with his hands a cross-bar connected with springs and adjusted weights. The operation consists in straightening the bent knees, preserving the spine, erect shoulders, hips, and ankles plumb—and slowly raising the weights through a space of 3 or 4 inches, and as slowly returning them, then raising up again, drawing a deep inspiration. By the action of the springs the muscles are caused to act very gradually so that all strain is prevented. This lift-movement brings all the muscles into play, and causes the blood to flow from center to circumference, thus filling the capillaries of the superficial parts, warming the extremities, inducing sleep, relieving sluggish digestion, etc. It gives the greatest amount of exercise with the least nervous exhaustion, and in the shortest possible time.

MASSAGE.—See the article on this subject in these Reviews and Additions.

MIND-CURE utilizes the effects of the various emotions of the mind upon the part of the body for the purpose of curing disease. Faith-cure is a special form of mind-cure, the effects of religious emotions being utilized for healing bodily ailments.

COLOR-CURE induces certain bodily conditions by exposing the person to the effects of certain colors. It maintains that red walls in our rooms, or red light coming in through a window, etc., stimulate and excite our nerves, while blue ones depress us etc., and claim that neuralgia, rheumatism and other disorders can be cured by using certain colors on walls or windows.

SUN-CURE is the healing of certain diseases by exposing the affected parts to the direct rays of the sun. The effects of the sun's rays are as beneficial to man as to plants. We have seen a cancer apparently cured by this means.

MEDICK (*Medicago*), a genus of plants of the natural order *Leguminosæ* sub-order *Papilionacæ*, nearly allied to clover, but distinguished from that and kindred genera by the sickle-shaped, or, in most species, spirally twisted legume. The species, which are very numerous, are mostly annual and perennial herbaceous plants, with leaves of three leaflets like those of clover, and are natives of temperate and warm climates. They afford good green food for cattle, and some of them are cultivated like the clovers for this use, amongst which the most important is the Purple Medick, of Lucerne. Besides this, the Black Medick or Nonsuch (*M. lupulina*) is one of the most generally cultivated.

MEDINA, a post-village of Orleans county, N. Y., on the Erie Canal. It has manufactories of flour, carriages, pumps and farming tools.

MEDINA, a post-village, the county-seat of Medina county, Ohio. It contains a normal school, flour, saw, and planing mills, a foundry and other manufactories.

MEEK, FIELDING BRADFORD, an American paleontologist, born at Madison, Ind., in 1817, died at Washington, D. C., in 1876. He first engaged in

mercantile pursuits until 1848, when he became an assistant in the United States geological survey of Iowa, Wisconsin and Minnesota. During 1852-58 he assisted James Hall in his paleontological work of the State of New York, except in summers, when he was engaged in field-work. After 1858 he resided in Washington, D. C., and devoted his time to investigating the organic remains gathered by the government exploring expeditions. The invertebrate paleontology of the Rocky Mountains, as developed by the survey of Prof. Hayden, was entrusted to Mr. Meek. He also studied the paleontology of Illinois, Ohio, California, and of several of the territories. With Ferd. V. Hayden he published through the Smithsonian Institution: *Paleontology of the Upper Missouri* (1865); and alone *Check-List of the Invertebrate Fossils of North America* (1864), and also *Report on the Invertebrate, Cretaceous, and Tertiary Fossils of the Upper Missouri Country* (1876).

MEGALONYX, a large fossil edentate of the United States, smaller than the Megatherium.

MEGRIM, the popular term for neuralgia occupying one half of the head, or more commonly only the brow and forehead of one side. It is often periodical, but may be induced by any cause that debilitates the system.

MEGRIMS and VERTIGO, terms usually employed when a horse at work reels, and then either stands for a minute dull and stupid, or falls to the ground, lying for a time partially insensible. These attacks come on suddenly and are most frequent during hot weather when the animal is doing heavy work. Liability to megrims constitutes unsoundness, and usually depends upon the circulation through the brain being temporarily disturbed by the presence of tumors, or by weakness of the heart's action.

MEIAPONTE, a town of Brazil, sixty-five miles east of Goyas, on the river Almas. It has five churches, a hospital, a Latin and primary school, and many distilleries and potteries, and is well situated for trade.

MEIGS, HENRY (1811-1877), an American contractor. For several years he was in the lumber business in New York City, but in the financial crisis of 1854 his debts amounted to \$1,000,000 and he fled to South America. He then engaged in building bridges on the Valparaiso and Santiago road in Chili, and later constructed railroads in that country from which he realized a profit of over \$1,500,000. He next undertook the building of six railroads in Peru, three of which he completed, and the remainder were in course of construction when he died. One of these, the Callas, Lima, and Oroya road ranks among one the most daring achievements of modern engineering. Before his death Mr. Meigs met all of his former obligations in the United States.

MEIGS, CHARLES DELUCENA (1792-1869), an American physician. He began the practice of medicine in Augusta, Ga., but in 1814 went to Philadelphia. From 1841 to 1861 he was professor of obstetrics and the diseases of women and children in Jefferson Medical College. He published, besides numerous translations, *The Philadelphia Practice of Midwifery* (1838); *Woman, Her Diseases and Remedies* (1847); *Obstetrics, the Science and Art* (1849); *Observations on Certain Diseases of Children* (1850); *Treatise on Acute and Chronic Diseases of the Neck of the Uterus* (1854), and *On the Nature, Signs and Treatment of Child-Bed Fevers* (1854).

MEIGS, MONTGOMERY CUNNINGHAM, an American soldier, son of Charles Delucena Meigs, born in 1816. He entered the United States army in 1836, and served on the corps of engineers till 1861 when he was appointed to organize an expedition to relieve

Fort Pickens, Fla., which was besieged by the Confederate forces. The same year he was made colonel of the 11th infantry, and a little later quartermaster-general of the United States army, which post he held until his retirement in 1882. He has published the annual reports of the quartermaster's department from 1861 to 1882, besides other government reports. He died in 1892.

MEIGS, RETURN JONATHAN (1740-1823), an American soldier. He entered the American army at the beginning of the Revolutionary war, became a major, and in 1777 a colonel. In that year at the head of 170 men he attacked the British troops at Sag Harbor, L. I., captured ninety prisoners and destroyed twelve vessels without the loss of a man.

MEIGS, RETURN JONATHAN (1765-1825), a United States Senator, son of the preceding. He began the practice of law in Marietta, Ohio, in 1788, and in 1803-4, was chief justice of the State supreme court. In 1807 he was appointed judge of the United States district court of Michigan, and in 1809-10, was a United States Senator from Ohio. From 1810 to 1814, he was governor of his State. He then became Postmaster-General in President Madison's Cabinet, and continued to hold the office until 1823, when he retired at Marietta, to pass the remainder of his life.

MEILHAC, a French playwright, born in Paris, in 1831. He was trained as an artist, and published his first dramatic work in 1855. He has subsequently produced a long series of light comedies—some in conjunction with Halevy. Some are well-known through Offenbach's music. His *Chef-d' Œuvre* is *Frou-Frou*.

MEISSONIER, JEAN LOUIS ERNEST, figure painter, born at Lyons, Feb. 21, 1813, died Jan. 31, 1891. When he was still a child his father established himself as a druggist in Paris; and the son, having resolved upon art as a profession, studied under Jules Potier and Léon Cogniet. His drawings were praised by Johannot, and about 1833-34, he was employed by Curmer the publisher on designs for the *Royaumont Bible* and other works. He first made a distinct mark in 1838, and by his illustrations to *Paul and Virginia* and the *Chaumière Indienne*. In 1834 he began to contribute to the *Salon*. Two years later he exhibited the first of his various groups of *Chess-Players*. It was followed by a long series of elaborate and successful genre-pictures, in which, with the most careful and finished execution, and with the most perfect verisimilitude of costume and local coloring, the artist depicted the civil and military life of the 17th and 18th centuries. Passing to subjects of genre or history taken from the nineteenth century. Among the most celebrated of his military scenes may be named *La Rize*, purchased by Queen Victoria. He also executed some striking portraits. Finally, we may refer to his design for the decoration of the Panthéon—"the apotheosis of France"—the cartoons of which were exhibited to the commission in 1889. He became a commander of the Legion of Honour in 1867, grand cross 1889, and a member of the institute in 1861, and he was an honorary member of the Royal Academy.

MELANORRHŒA, a genus of trees of the natural order *Anacardiaceæ*. To this genus belongs the black varnish tree (*M. Usitatissima*) of Burmah and of the northeast of India. It attains a height of 100 feet, with large, leathery, entire leaves, and axillary panicles of flowers. It yields a viscid rust-colored juice, which becomes black on exposure to the atmosphere, and is valued as a varnish for painting boats, and also as a size-glue in gilding. A similar varnish is yielded in India by

the fruits of *Holigana Longifolia*, also of the natural order *Anacardiaceæ*.

MELA-ROSA, a fruit of the genus *Citrus*, and probably a variety of the Lime, cultivated in Italy.

MELASTOMACEÆ, a natural order of exogenous plants, containing about 1,200 known species; trees, shrubs, and herbaceous plants, mostly natives of warm climates, although a few are found in the temperate parts of North America. They have opposite undivided leaves, destitute of dots. The flowers are regular. None of the *Melastomaceæ* possesses poisonous properties; some are used in dying, and the fruit and leaves of others as articles of food.

MELICOCOA, a genus of trees or shrubs of the natural order *Sapindaceæ*, with alternate, abruptly pinnate leaves, and elongated racemes or panicles of many small whitish flowers. *M. bijuga*, a native of the West Indies, is there universally cultivated for its fruit. It is called the Honey Berry, and the Jamaica Bullace Plum. It is from 16 to 20 feet high. The fruit is jet black, about the size of a bullace, and the seeds are roasted and eaten like chestnuts. Other species of *Melicococa* yield eatable fruits.

MELIKOFF, LORIS, a Russian general, born at Lori, Jan. 1, 1826, died in 1888. He served with distinction in the Crimea, and was made a count. He was successively governor of Astrakan and governor of Kharkov. In 1880 he was appointed chief of a commission to which was granted extraordinary power to deal with Nihilism. Subsequently he became minister of the interior.

MELILOT (*Melilotus*), a genus of clover-like plants of the natural order *Leguminosæ*. The Common Melilot, a yellow-flowered annual, has when in flower the peculiar sweet odor of *Tonka Bean*. The flowers and seeds are used in flavoring Gruyère cheese. The Blue Melilot (*M. cærulea*), a native of the north of Africa, with short racemes of blue flowers, is cultivated in many parts of Europe. The name Bokkara Clover has been given to one or more species.

MELODRAMA, strictly a half-musical drama, in which declamation is interrupted from time to time by instrumental music. The name, however, which was first applied to the opera, has come to designate a romantic play, depending mainly on sensational incidents, thrilling situations, and an effective dénouement. The expression "transpositional drama" refers to a time when such plays were identified with houses on the Surrey side of the Thames.

MELON, the common name for fruits of vines of the *Cucurbitaceæ* or gourd family. In speaking of melons in America we always mean either "water-melons" or "musk-melons." Both of these varieties are grown in enormous quantities, and are very popular as dessert-fruits. Among musk-melons (cantaloupes) the small netted forms are the sweetest and most popular. Water-melons grow best in the sandy soils of the seaboard of southern countries. In South Carolina they have reached 45 lbs. Their flesh is red, very juicy, and watery. As many as 160,000 water-melons have passed over the ferries to New York City in a single day. Where the ground is richly manured, the culture of water-melons pays very handsomely, often over \$500 per acre. See *Britannica*, Vol. XV, p. 841.

MELROSE, a city of Middlesex county, Mass., nine miles north of Boston. It has manufacturing of boots and shoes, furniture, silver polish, and sewing-machine needles. Population, 8,500.

MELTING-POINT. The following are some of the most important melting-points, which may also

be regarded as the freezing-points of the corresponding liquids:

	Cent.	Fah.		Cent.	Fah.
Alcohol pure	-180	-202	Sulphur.....	115	239
Hydrobromic acid..	-120	-184	Lithium.....	180	356
Strongest sulphuric acid.....	-116	-177	Solder about.....	180	356
Sulphurated hydrogen.....	85	-121	Tin.....	228	442
Ammonia.....	75	-108	Bismuth.....	267	513
Sulphurous acid.....	75	-108	Lead.....	324	633
Chloride.....	75	-108	Antimony.....	430	806
Carbonic acid.....	70	-94	Zinc.....	450	842
Chloroform.....	70	-94	Magnesium.....	about 750	1382
Mercury.....	39-38	-38-88	Bronze.....	900	1652
Olive and linseed oil.....	20	-4	Silver.....	1000	1832
Bromine.....	-7-3	-19-86	Brass.....	1015	1860
Ice.....	0	32	Copper.....	1100	2012
Glacial acetic acid.....	17	62-6	Iron, white cast.....	1100	2012
Phosphorus.....	42-2	111	Iron, gray cast.....	1225	2237
Potassium.....	62-6	144-5	Gold, pure.....	1250	2282
Sodium.....	95-6	204	Steel.....	1350	2462
Iodine.....	113	235	Soft iron.....	1550	2822
			Manganese.....	1600	2912
			Platinum.....	1800	3272
			Iridium.....	1950	3542
			Osmium.....	2500	4532

Melting-points beyond about 900° or 1,000° F. are merely approximate and relative.

MELVILLE, the name of an island, a sound and a peninsula in the polar regions of North America. The island is 200 miles long by 180 miles broad. The sound, about 250 miles long by 200 broad, extends southeast of the island and communicates with the Arctic Ocean and with Baffin Bay. The peninsula projects from the continent at its north-eastern corner. It is 250 miles in length by about 100 in average breadth. Another Melville Island lies off the coast of North Australia. Its length is 70 miles; breadth 30 miles.

MELVILLE, HERMAN, an American author, born in 1819. He became a sailor in 1837. In 1842, while cruising in the South Pacific, he and several of his companions determined to leave the ship on account of the harsh treatment of the captain, and while she lay in a harbor of the Marquesas Islands they made their escape. The party of sailors fell in with a war-like tribe of cannibals and were taken prisoners, but after four months of captivity the party made its escape on board an Australian whaler. On his return to the United States Melville published a narrative of his captivity entitled *Typee: a Peep at Polynesian Life During a Four Months' Residence in a Valley of the Marquesas*, which passed rapidly through several editions. Among his later works are *Omoo, a Narrative of Adventures in the South Seas* (1847); *Mardi, and a Voyage Thither* (1848); *Redburn* (1848); *White-Jacket, or the World in a Man-of-War* (1850); *Moby Dick, or the White Whale* (1851); *Pierre, or the Ambiguities* (1852); *Israel Potter, His Fifty Years of Exile* (1855); *The Piazza Tales* (1857); *Battle-Pieces, and Aspects of the War* (1866), and *Clarel, a Pilgrimage in the Holy Land* (1876).

MEMMINGER, CHARLES GUSTAVUS, an American statesman, born in Würtemberg, Germany, in 1803, died in Charleston, S. C., in 1888. Being left an orphan when an infant Gov. Thomas Bennett adopted and educated him. He graduated at South Carolina College in 1820 and was admitted to the bar of Charleston in 1825. During the nullification excitement he was a leader of the Union party, and wrote *The Book of Nullification* (1832-33), in which he satirized the advocates of that doctrine in Biblical style. In the legislature he opposed the suspension of specie payments by the banks in 1839, and served for about 20 years as chairman of the finance committee. In 1860 Memminger was one of the leaders of the secession movement, and when

the Confederate government was formed, he became secretary of the treasury, and held this post until 1864. After the civil war he lived in retirement.

MEMPHIS, a post-village, the county-seat of Scotland county, Mo., containing flour-mills.

MEMPHIS, a city of Tennessee, the commercial metropolis of West Tennessee, and the most important commercial city between St. Louis and New Orleans. In addition to the facilities afforded by the Mississippi River, on which it is situated, numerous lines of railroads bring the products of a large section of country to its wharves. The city is handsomely built on a bluff overlooking the river. It is one of the most extensive cotton markets of the country, the shipments of cotton amounting to over 400,000 bales per annum. The principal manufactures are iron, iron-goods, cotton-seed oil, lumber, tobacco, farm-machinery, etc. Memphis has a number of excellent public and private schools and seminaries. Population in 1880, 33,592; in 1890, 64,586. See *Britannica*, Vol. XV, pp. 847, 848.

MENABREA, LUIGI FEDERICO, MARQUIS VALL-DORA, an Italian statesman, born at Chambéry, France, in 1809. He was professor of engineering in the military academy at Turin. Afterwards he served in the Italian ministry of war and of the interior. In the war against Austria in 1859 he was chief of staff, and fortified Bologna and other cities, and conducted the siege of Gaëta. In 1861 he was made count and appointed minister of the marine, and in 1867 he was minister of foreign affairs. In 1875 he was created Marquis of Vall-Dora, and in 1876 he served as ambassador to England. He is an accomplished mathematician and engineer, and has published *Le Génie Italien dans la Campagne 1860-61* (1866).

MENAGERIE, see ZOOLOGICAL GARDEN in these Revisions and Additions.

MENASHA, a city and railroad center of Winnebago county, Wis., eighteen miles north of Oshkosh. It has a number of manufactures. Population, 4,569.

MENDE, the capital of the French department of Lozère, on the Lot, in a valley surrounded by high hills, sixty-six miles from Nîmes, has a cathedral, and manufactures serges and coarse cloths. Population, 6,740. See *Britannica*, Vol. XV, p. 31.

MENDELEEFF, DMITRI IVANOVITCH, a Russian chemist, born at Tobolsk, Feb. 7, 1834, studied at St. Petersburg, and, after having taught at Simferopol, Odessa, and St. Petersburg, became professor of chemistry in the University of St. Petersburg in 1866. He has enriched every section of chemical science, but is especially distinguished for his contributions to physical chemistry and chemical philosophy.

MENDOTA, a city of La Salle county, Ill., containing an organ-factory and iron-foundry.

MENIER, EMILE JUSTIN, a French manufacturer and writer, born at Paris, May, 18, 1826, died at Noisiel-sur-Marne, February 17, 1881. He established at Noisiel the celebrated chocolate factory, chemical works at St. Denis, and a sugar manufactory at Roze, besides a caoutchouc factory, and in Nicaragua a cocoa plantation. A warm advocate of free trade, he expounded his views in *Économie Rurale* and in *L'Avenir Économique*.

MENIPPUS, a satirist who lived in the first half of the 3rd century, a. c., was born a Phœnician slave and became a cynic philosopher. His works in Greek have perished, and he is known only through the imitations of Marcus Tarentinus Varro. See *Britannica*, Vol. XXIV, p. 93; Vol. IX, p. 655.

MENOMINEE, a city, the county-seat of Menominee county, Mich., situated on Green Bay, at the

mouth of the Menominee River. Iron-mining, marble-quarrying, and lumber-shipping are the chief industries. Population in 1890, 10,606.

MENOMONIE, a city, the county-seat of Dunn county, Wis., about twenty-five miles northwest of Eau Claire. It is extensively engaged in the fur-trade, has manufactories of iron, machinery, carriages, sash and blinds, and enjoys excellent educational facilities.

MENZEL, ADOLPH, a German painter, lithographer, illustrator, and engraver, born at Breslau, Dec. 8, 1815. He is best known for his drawings and oil-paintings illustrative of the times of Frederick the Great and William I., emperor—pictures characterized by historical fidelity, strong realistic conception, originality, and humor. His *Adam and Eve*; *Christ Among the Doctors*, and *Christ Expelling the Money-changers*, are also notable pictures.

MEPPEL, a town in the Netherlands province of Drenthe, eighteen miles from Zwolle. It has a trade in butter and linen manufactures. Population, 8,418.

MERCADANTE, SAVERIO (1798-1870), an Italian composer, born at Altamura, June 26, 1797, studied music at Naples, and began his career as a violinist and flutist. In 1818 he produced the first of some sixty operas. From 1827 to 1831 he was in Spain; in 1833 he was appointed musical director in the cathedral at Novara, and in 1840 of the conservatory of music at Naples. He died in that city Dec. 17, 1870—blind since 1861.

MERCED, a city, the county-seat of Merced county, Cal., on the Central Pacific Railroad, 152 miles southeast of San Francisco.

MERCER, a post-borough, the county-seat of Mercer county, Pa., sixty miles northwest of Pittsburgh. Population, 2,334.

MERCER, CHARLES FENTON (1778-1858), an American soldier. In 1798 he was commissioned captain in the United States army, but subsequently practiced law in Fredericksburg, Va. From 1810 to 1817 he was a member of the legislature, and then until 1840 was a member of Congress. During the war of 1812 he was aide to the governor of Virginia, and in command of the defenses at Norfolk.

MERCER, HUGH (1720-1777), an American soldier. He served in the French and Indian war of 1755, and in 1758 was made a lieutenant-colonel. In 1776 he was appointed colonel of the 3rd Virginia regiment, and the following year was chosen by Congress brigadier-general. He was mortally wounded in the night march on Princeton in which he commanded the advance.

MERCERSBURG, a post-borough of Franklin county, Pa., ten miles northwest of Greencastle. It contains Mercersburg College, and was formerly the seat of Marshall College and a Theological Seminary of the German Reformed church.

MEREDITH, GEORGE, an English novelist and poet, born in Hampshire, Feb. 12, 1828, and made his first appearance as an author in 1851 in a little volume of poems. This was followed by *The Shaving of Shagpat*: an Arabian Entertainment, a highly original tale, in burlesque imitation of the manner of the Eastern story-teller. The series of Mr. Meredith's greater and more characteristic works began in 1859 with *The Ordeal of Richard Feverel*: A History of a Father and a Son, a tragic romance, dealing with the larger problems of education, especially in its ethical aspects. *Beauchamp's Career* is perhaps the most perfectly constructed of all the series. *Diana of the Crossways* is by general consent the most charming of Mr. Meredith's novels. Much of his writing deals more or less directly, in a serious manner, with the most important problems of politics, sociology, and ethics. It is in his poetry

that his deepest views of life really find their directest and most elementary expression.

MERIDEN, a busy inland manufacturing city of Connecticut, on the Hartford & New Haven Railroad, about midway between these cities. The leading articles of manufacture are britannia, metal and silver plated ware, in which it exceeds any other city of the world. It produces much other hardware, bronze goods, fire-arms, cutlery, etc. Population in 1890, 21,230. See *Britannica*, Vol. XVI, p. 37.

MERIDIAN, a post-village, the county-seat and a railroad junction of Lauderdale county, Miss., eighty-five miles east of Jackson. It has two female seminaries, machine shop, steam corn-mills, and manufactories of furniture, doors, sashes and blinds plows, and cotton yarn. Population, 10,889.

MERIVALE, JOHN HERMAN, an English scholar and translator, born at Exeter, 1779, died in 1884. He was sent to St. John's College, Cambridge, and was called to the bar in 1805. He contributed largely so Bland's *Collections From the Greek Anthology*. From 1831 to the time of his death he held the office of commissioner of bankruptcy. Works of no little merit were his *Poems*, *Original and Translated*, and *Minor Poems of Schiller*. CHARLES, his son, was born in 1808, and educated at Harrow, Haileybury, and St. John's College, Cambridge, where he took his degree in 1830. He was chaplain to the speaker from 1863 to 1869, when he was appointed dean of Ely. His chief works are the *Fall of the Roman Republic*, and *History of the Romans Under the Empire*. Another son, HERMAN, born in 1806, was educated at Harrow and Trinity College, Oxford, elected Fellow of Balliol, called to the bar in 1832, and appointed professor of political economy at Oxford, in 1837, and, later, permanent under-secretary of state first for the colonies, next for India. In 1859 he was made C.B. He died on Feb. 8, 1874. His son, HERMAN CHARLES, born in 1839, has written a number of successful plays.

MERMAID'S GLOVE (*Halichondria Palmata*), the name given to the largest of British sponges. It grows in deep water, and is sometimes 2 feet high. It is yellowish and rough, with myriads of minute fragile spiculæ. The surface is very porous.

MEROM, a post-village of Sullivan county, Ind., on the Wabash River, thirty-five miles below Terre Haute. It is the seat of Union Christian College (Christian connection).

MERRILL, a city, the county-seat of Lincoln county, Wis., on Wisconsin River.

MERRIMAC, a village of Massachusetts, on the Merrimac River, about eight miles northeast of Haverhill. It is engaged in the manufacture of shoes and carriages.

MESAGNA, a town in southern Italy, twelve miles southwest of Brindisi. It produces good olive-oil. Population, 9,601.

MESENTERY, the broad fold of peritoneum which attaches the intestines posteriorly to the vertebral column. It serves to retain the intestines in their place, while at the same time it allows the necessary amount of movement; and it contains between its layers the blood vessels and nerves which pass to them, the lacteal vessels, and the mesenteric glands.

MESQUIT. See *MEZQUITE* in these Revisions and Additions.

MESSENGERS, KING'S (QUEEN'S), officers employed by secretaries of state to convey valuable and confidential dispatches at home and abroad.

METALLURGY. See *BRITANNICA*, Vol. XIV, pp. 57-63.

METALS. See *BRITANNICA*, Vol. XVI, pp. 63-70.

METHODIST EPISCOPAL CHURCH. See *BRITANNICA*, Vol. XVI, pp. 185-93. See also *RELIGIOUS DENOMINATIONS IN THE UNITED STATES* in these Revisions and Additions.

METHUEN, a post-village of Essex county, Mass., lying between the New Haven State line and the Merrimac River. It manufactures cottons, woollens, jute, hats and shoes. Population 4,807.

METONYMY (Gr. *metonymia*, signifying a change in the name) a figure of speech by which one thing is put for another to which it bears an important relation, as a part for the whole, the effect for the cause, etc. For example, "*Lying lips are an abomination to the Lord.*" This figure is very expressive, and is much used in proverbial and other pithy modes of speech.

METROPOLIS CITY, the county-seat of Massac county, Ill., on the Ohio River, forty miles from its mouth. It has a steam-ferry, ship-yards, saw and flour-mills.

METTRAY, a village of France, five miles north of Tours, noted for its great agricultural and industrial reformatory, the parent of all such institutions. It dates from 1839, and in 1886 had 537 inmates.

MEULEBEKE, a town in the Belgian province of West Flanders, on the Mandel, a tributary of the Lys, twenty-four miles southwest of Ghent. Population, 9,063.

MEXICAN WAR. See *BRITANNICA*, Vol. XVI, pp. 219-20; Vol. XXIII, p. 767.

MEXICO, the county-seat of Audrain county, Mo., 108 miles northwest of St. Louis. It contains mills and a female seminary. Population, 4,789.

MEXICO, a post-village of Oswego county, N. Y. It has a tannery, flour and grist mills, foundry and carriage factories.

MEXICO, REPUBLIC OF. For general article on Mexico, see *BRITANNICA*, Vol. XVI, pp. 206-222. The latest official estimates of the area and population of Mexico are those of 1889, which furnish the following figures: Total area of the Republic, 740,970 square miles; population, 11,632,924, an increase during the last ten years of 1,724,912.

CONSTITUTION AND EXECUTIVE GOVERNMENT.—The Mexican Constitution now in force, was adopted Feb. 5, 1857, and modified at different dates down to 1887. Under its terms Mexico is declared a federative republic, divided into states—19 at the outset, but at present 27 in number, with two territories and the federal district—each of which has a right to manage its own local affairs, while the whole are bound together in one body politic by fundamental and constitutional laws. The powers of the supreme government are divided into three branches, the legislative, executive, and judicial. The legislative power is vested in a congress consisting of a house of representatives and a senate, and the executive in a president. Representatives elected by the suffrage of all respectable male adults, at the rate of one member for 40,000 inhabitants, hold their places for two years. The qualifications requisite are, to be twenty-five years of age, and a resident in the state. The senate consists of fifty-six members, two for each state, of at least thirty years of age, who are returned in the same manner as the deputies. The members of both houses receive salaries of 3,000 dollars a year. The president is elected by electors popularly chosen in a general election, holds office for four years, and, according to an amendment of the constitution in 1887, may be elected for two consecutive terms of four years each. The senator who presides over the senate by monthly election acts temporarily in default of the president of the Re-

public. Congress has to meet annually from April 1 to May 30, and from September 17 to December 15, and a permanent committee of both houses sits during the recesses.

President of the Republic, 1891.—General Porfirio Diaz; installed president of the Republic, as successor of General Manuel Gonzales, December 1, 1884; reelected and entered his second period of four years on December 1, 1888. The administration is carried on, under the direction of the President, by a council of six secretaries of state, heads of the departments of justice, finance, the interior, war and navy, foreign affairs, and public works.

The following table gives the populations of the Federal (capital city) district and the states severally, as carefully reported in the general census of 1879, and as officially estimated by the State governments in 1889:

State.	Area in square miles.	Population, 1879.	Estimated Population, 1889.
Federal District.....	463	351,804	451,246
Mexico.....	7,840	710,579	779,969
Morelos.....	1,776	159,160	151,540
Tlaxcala.....	1,632	138,988	155,151
Guanajuato.....	11,413	834,845	1,007,116
Puebla.....	12,019	784,466	839,468
Queretaro.....	3,205	203,250	213,535
Hidalgo.....	8,161	427,330	494,212
Aguas Calientes.....	9,897	140,430	121,926
Michoacan.....	23,714	661,534	830,926
Jalisco.....	33,174	983,484	1,161,709
Oaxaca.....	33,582	744,000	806,845
Veracruz.....	26,232	542,918	644,157
San Luis Potosi.....	27,503	516,486	546,447
Zacatecas.....	29,999	422,506	526,966
Colima.....	3,746	65,827	69,547
Chiapas.....	16,048	205,362	266,496
Guerrero.....	24,552	295,590	332,887
Yucatan.....	29,569	302,315	282,552
Tabasco.....	11,849	104,747	114,028
Nuevo Leon.....	23,637	208,354	244,052
Sinaloa.....	36,200	186,491	223,684
Tamoulipas.....	27,916	140,137	189,139
Durango.....	42,511	190,846	265,931
Campeche.....	25,834	90,413	91,180
Chihuahua.....	89,715	225,541	298,073
Coahuila.....	50,904	130,026	133,337
Sonora.....	79,020	115,424	150,391
Ter. Lower California.....	61,563	80,208	84,668
Territory of Tepic.....	11,270	.....	180,019
Total.....	740,970	9,908,011	11,632,924

The chief cities in 1889 reported their populations thus: Mexico, 829,355; Guadalajara, 95,000; Puebla, 78,530; San Luis Potosi, 62,573; Guanajuato, 52,112; Leon, 47,939; Monterey, 41,700; Aguas Calientes, 32,355; Merida, 32,000; Oaxaca, 28,327; Colima, 25,124; Vera Cruz, 24,000. In 1887 the number of Spaniards residing in the country was 9,553.

REVENUE AND EXPENDITURES.—The revenues and expenditures since and including 1885, have been:

REVENUE.	EXPENDITURE.
1885-86.....\$ 26,770,873	1885-86.....\$ 31,672,836
1886-87.....28,711,817	1886-87.....33,783,919
1887-88.....32,321,399	1887-88.....36,370,448
1888-89.....32,745,981	1888-89.....38,527,239
1889-90.....36,500,000	1889-90.....36,729,542

The expenditures for 1887-88 and 1888-89 being given as approximately correct.

The following are the budget estimates of revenue and expenditure for the year ending June 30, 1891:

REVENUE.	EXPENDITURE.
Customs.....\$ 26,200,000	Legislative power. \$ 1,054,036
Excise.....1,500,000	Executive ".....49,849
Stamps.....9,400,000	Judicial ".....468,884
Direct taxes.....1,400,000	Foreign Affairs.....371,308
Posts and Telegraphs.....1,200,000	Home Department.....8,678,679
Mint.....270,000	Justice and Education.....1,424,973
Lotteries.....300,000	Public works.....7,310,320
Various.....1,500,000	Finance.....11,365,207
	War and Navy.....12,629,543
\$ 41,770,000	\$ 38,452,803

The Revenue and the expenditure of the various states, according to the latest official data collected in 1885, balanced at 9,118,977 dollars. In the five years 1881-85 the total revenues of the States amounted to 40,163,241 dollars, and of the municipalities to 24,323,200 dollars.

THE DEBT OF MEXICO.—The debt is held in England. On June 23, 1886, arrangements were made between the Mexican government, and the bondholders of the several Mexican debts by which the total amount of the English debt recognized by Mexico was 22,341,322 $\frac{1}{2}$, and the arrangement reduced it to 13,991,775 $\frac{1}{2}$; Mexico, therefore, being relieved by 8,349,597 $\frac{1}{2}$. On July 1, 1889, in accordance with this arrangement, 41 $\frac{1}{4}$ per cent of the whole outstanding debt was redeemed, viz., 40 per cent. for the capital as per agreement of June 1886, and 1 $\frac{1}{4}$ per cent. for the interest of the half-year.

On June 11, 1888, the conversion was primarily closed and another delay given, with the following results (January 1890):—

Of the 10,241,650 $\frac{1}{2}$ of the 1851 bonds 10,194,000 $\frac{1}{2}$ were presented to the conversion, 47,650 $\frac{1}{2}$ thereby remaining as deferred. In exchange of the arrears of interest of the above bonds, new converted bonds of 1886 were given to the amount of 912,632 $\frac{1}{2}$ ls. 3d. Of the 4,864,000 $\frac{1}{2}$ of 1864 bonds, 4,792,100 $\frac{1}{2}$ were presented to the conversion, and in exchange of them now converted bonds of the value of 2,895,971 $\frac{1}{2}$ ls. were given; balance not presented is 63,400 $\frac{1}{2}$.

With other classes of bonds the total of the new converted bonds issued in London by the Mexican Financial Agency was 4,585,000 $\frac{1}{2}$, which, added to the 1851 bonds—10,142,400 $\frac{1}{2}$ —give a total of 14,727,400 $\frac{1}{2}$.

In March 1888 the Mexican government contracted a loan in London and Berlin for 10,500,000 $\frac{1}{2}$ in 6 per cent. bonds. Of these, 3,700,000 $\frac{1}{2}$ were issued at 78 $\frac{1}{2}$, and the proceeds applied by the Mexican government to the payment of the outstanding floating debt of the Republic since the year 1882. The remainder, 6,800,000 $\frac{1}{2}$, according to the contract for the loan, was taken at the option of the contractors before July 1, 1889, at 86 $\frac{1}{2}$ per cent. The contractors gave in exchange one part in converted bonds, and the proceeds of the other part were applied to effect the redemption at 41 $\frac{1}{4}$ per cent. of all the outstanding converted bonds in July 1889. The object (which has been realized) of this part of the loan was to redeem the 1851 debt and the converted bonds at the rate of 40 per cent., according to the agreement made between the government and the bondholders, and referred to above, on June 23, 1886. The conversion of all the internal debts of the Republic, which is being carried into effect in Mexico, has reached 31,500,000 dollars and very little more remained to be converted. The interest on the internal debt for claims not presented for conversion is, from 1890, at 3 per cent. All coupons have been punctually paid since 1886. On May 27, 1890, the conversion of the old debts was closed. On September 12, 1890, a new 6 per cent. loan for 6,000,000 $\frac{1}{2}$ was issued at 93 $\frac{1}{2}$ in London, Berlin and Amsterdam, the proceeds to be applied to paying off arrears and balances of rail-

way subventions amounting to \$40,000,000, assigned in the form of percentages of customs revenue. Including this loan the total foreign debt amounts to 16,500,000.

The total Mexican debt (including foreign and home) on Jan. 1, 1891, was \$113,600,000.

ARMY AND NAVY.—The army consists of infantry, 22,437; artillery, 2,120; cavalry, 6,359; auxiliary cavalry, 1,483; rural guards or police, 2,200; gendarmery, 229; total, 34,833. There are 2,270 officers. Every Mexican capable of carrying arms is liable for military service from his twentieth to his fiftieth year.

There is a fleet of two unarmored gun-vessels, each of 450 tons and 600 horse-power, and armed with two 20-pounders; and three small gunboats.

TRADE AND COMMERCE.—The subjoined table shows the proportion of precious metal and other produce of Mexico for several recent years:

Years.	Sundries.	Precious Metal.	Total.
1884-85	13,425,190	\$ 33,128,190	\$ 46,553,380
1885-86	13,741,316	29,906,400	43,647,716
1886-87	15,631,127	33,560,502	49,191,629
1887-88	17,879,720	31,006,183	48,885,903
1888-89	21,373,115	38,785,275	60,158,390
1890-91	23,873,098	38,021,230	62,490,328

The trade of Mexico lies chiefly with the following countries in the last four years, so far as exports are concerned; the following table includes precious metals:

Countries.	Exports to			
	1885-86.	1886-87.	1887-88.	1888-89.
United States....	\$ 25,429,594	\$ 27,728,714	\$ 31,059,627	\$ 40,853,262
England.....	11,600,067	13,362,187	10,540,965	19,555,534
France.....	4,936,276	5,112,521	4,474,723	3,496,033
Germany.....	1,571,399	2,175,760	2,177,106	2,061,563
Spain.....	913,253	625,294	457,842	659,330
Other countries.	122,192	187,444	175,645	552,596

MEYER, CONRAD FERDINAND, a Swiss poet and novelist, born Oct. 12, 1825 at Zürich, near which he finally settled in 1877. His style is graceful, and he excels in character-drawing and in genre-pictures of descriptive work.

MEYER, HEINRICH AUGUST WILHELM, commentator, born at Gotha, Jan. 10, 1800, died in Hanover, June 21, 1873. He studied at Jena, was pastor at Harste, Hoyde, and Neustadt, retired in 1848, and settled in Hanover. His name survives in his commentaries on the New Testament—a monument of exegetical science.

MEYER, JOHANN GEORG, a German painter, born at Bremen in 1813. He studied art at Düsseldorf, and turned his attention to *genre*, acquiring great popularity by his pictures of children. They have given him the surname of "Kinder-Meyer." Several of his pictures are owned in the United States. Among the most noted are: *The Little Housewife*; *The New Sister*; *What has Mother Brought? Little Brother Asleep*; *The First Prayer*. He died in 1886.

MEZZANINE, a low story introduced between two higher ones, or occupying a part of the height of a portion of a high story. The term is also applied to the small windows used to light such apartments.

The following table shows the principal articles exported:

Products.	1887-88.	1888-89.
Hemp.....	\$6,229,460	\$6,272,593
Coffee.....	2,431,025	3,886,055
Hides and skins.....	1,864,470	2,011,129
Woods.....	1,752,237	1,390,215
Vanilla.....	61,370	926,908
Copper.....	615,669	817,989
Living animals.....	508,713	587,063
Lead.....	382,236	467,737
Gum.....	375,657	595,636
Ice.....	361,687	594,118
Tobacco.....	850,362	971,886
Silver.....	5,928,304	7,725,589

SHIPPING AND RAILWAY COMMUNICATIONS.—The shipping of Mexico (now, 1,270 vessels) includes small vessels engaged in the coasting trade. In the first six months of 1889, 2,768 vessels of 987,083 tons (118 of 70,489 tons, British), entered the ports of Mexico.

In 1890 there were 4,648 miles of railway open for traffic and 1,369 miles under construction. The capital invested by English companies was 14,601,380*l.*, and by American companies \$245,126,249 (U. S.). In 1889 twenty concessions were granted or amended for railways in various parts of Mexico. In 1889 there were 12,977,952 passengers, paying 2,090,505 pesos; and 875,894 tons of goods were conveyed at a charge of 4,822,690 pesos.

The total length of telegraph lines in 1889 was 27,861 English miles, of which 14,841 miles belonged to the Federal government, the remainder belonging, in about equal parts, to the states, companies, and the railways. In 1889 there were 1,448 post-offices.

The inland post carried 87,509,640 letters, newspapers, etc.; and the international, 87,193,403.

MEZZOJUSO, a town of Sicily, in the province of Palermo, eighteen miles from Palermo city. It is one of the four colonies of Albanians, who, on the death of Scanderberg, in the 15th century, fled to Sicily to avoid the oppression of the Turks. They preserve their language to a great extent, and follow the Greek ritual, their priests being allowed to marry. Population, 7,161.

MGLIN, a town of Russia, in the government of Tchernigov, 125 miles northeast of the town of Tchernigov. Mglin has a large cloth-factory, and a considerable number of German families. Population, 5,940.

MIAGAO, a town on the island of Panay, one of the Philippine Isles, in the province of Iloilo. The inhabitants, who are industrious, comfortable, and well educated, are estimated at 30,000 in number.

MIALL, EDWARD, an apostle of dis-establishment, born in 1809, died at Sevenoaks, April 29, 1881. He served as an Independent minister at Ware, and afterwards at Leicester, down to 1840, when he founded the "Nonconformist" newspaper. In 1844 he helped to establish the British Anti-State Church Association, known later as the Liberation Society, and sat in the House of Commons for Rochdale, 1852-67, and for Bradford, 1869-74. On

retiring he was presented with ten thousand guineas.

MIAMI, a river of Ohio, which rises by several branches in the western center of the State, and after a southwest course of 150 miles through one of the richest regions of America, and the important towns of Dayton and Hamilton, empties into the Ohio River twenty miles west of Cincinnati. It is sometimes called the Great Miami, to distinguish it from the Little Miami, a smaller river, which runs parallel to it, fifteen to twenty miles east, through the Miami Valley.

MIAMISBURG, a post-village of Montgomery county, O., situated in the center of the tobacco region of Miami Valley. It has fine water-power several mills and factories, a foundry and excellent schools.

MICHEL, FRANCISQUE, a learned French antiquary, born at Lyons, Feb. 13, 1809, became in 1839 professor in the Faculté des Lettres at Bordeaux, and died May 19, 1887. He earned a great reputation by his exhaustive researches in Norman history, French *chansons*, the Basques, the history of mediæval commerce, and many more among the by-ways of learning.

MICHELET, KARL LUDWIG, a celebrated German author and philosopher, born at Berlin, Dec. 4, 1801, died in 1876. In 1829 he became professor of philosophy in the University of Berlin. His works are of interest to students of Aristotle and of German philosophy.

MICHIGAN CITY, a town of Indiana. Population in 1890, 10,704. See Britannica, Vol. XVI, p. 241.

MICHIGAN LAKE. See Britannica, Vol. XIV, p. 217; Vol. XXI, pp. 178, 182.

MICHIGAN UNIVERSITY. See COLLEGES in these Revisions and Additions.

MICMACS. See NORTH AMERICAN INDIANS in these Revisions and Additions.

MICROLESTES, the name given to the earliest known mammalian form—a marsupial; it is discovered in the Trias of England and Würtemberg. Only the teeth, which are of small size, have been met with.

MICROSCOPE. See Britannica, Vol. XVI, pp. 257-78.

MICROTOME, an instrument for cutting thin sections of portions of plants and animals preliminary to their microscopic examination. The objects to be cut are imbedded in some material such as paraffin or celloidin, or frozen in gum, which makes the slicing of minute or delicate objects readily feasible. The instrument is a simple device by which a sliding razor slices a fixed but adjustable object, or by which the object is made to move up and down across the edge of a razor.

MIDDLEBURY, a post-village, the county-seat of Addison county, Vt., on Otter Creek. It is the seat of Middlebury College, has six marble quarries, good water-power, and manufactures flour, woolen, cotton, paper, leather, sash, blinds, and doors.

MIDDLEPORT, a post-village of Meigs county, Ohio, on the Ohio River.

MIDDLETON, ARTHUR (1742-1787), a signer of the Declaration of Independence. In 1775 he became a member of the Provincial Congress, and the following year was a delegate to the Continental Congress. In 1880 he was active in the defense of Charleston, S. C., and after the fall of that city was for sometime held as a prisoner of war. After his exchange he served in Congress until the close of the war. Later he was a State senator.

MIDDLETON, a town of Ireland, thirteen miles east of Cork. At the college (1696) Curran was educated. Population, 3,358.

MIDDLETOWN, a city of Connecticut. Population in 1890, 9,012. See Britannica, Vol. XVI, p. 283.

MICHIGAN, STATE OF. For general article on the STATE OF MICHIGAN, see Britannica, Vol. XVI, pp. 237-240. The census of 1890 reports the revised area and population of the State as follows: Area (including 1,485 square miles of water surface), 58,915 square miles; population, 2,093,899, an increase of 456,952, or 27.92 per cent., during the last decade. Capital, Lansing, with a population in 1890 of 13,102.

The population of the chief cities and towns of the State having a population of 8,000 or over were as follows in 1890:

Cities and Towns.	Population.		Increase.	Per cent.
	1890.	1880.		
Adrian.....	8,756	7,849	907	11.56
Alpena.....	11,283	6,153	5,130	83.37
Ann Arbor.....	9,431	8,061	1,370	17.00
Battle Creek.....	13,197	7,063	6,134	86.85
Bay City.....	27,439	20,693	7,746	37.46
Detroit.....	205,876	116,340	89,536	76.96
Grand Rapids.....	60,278	32,016	28,262	88.27
Iron Mountain.....	8,599	(*)		
Ishpeming.....	11,197	6,039	5,158	85.41
Jackson.....	20,798	16,105	4,693	29.14
Kalamazoo.....	17,853	11,937	5,916	49.56
Lansing.....	13,102	8,319	4,783	57.49
Manistee.....	12,313	6,930	5,383	77.81
Marquette.....	9,098	4,690	4,408	94.20
Menominee.....	10,630	3,288	7,342	223.30
Muskegon.....	22,702	11,262	11,440	101.58
Port Huron.....	13,543	8,883	4,660	52.46
Saginaw.....	43,322	29,441	13,881	47.15
West Bay City.....	12,981	6,397	6,584	102.92

* No population in 1880.

The land areas and populations of the several counties of Michigan, as reported in the census of 1890 were as follows, the areas being in square miles:

Counties.	Area.	Pop. 1890.	Pop. 1880.
Alcona.....	700	5,409	3,107
Alcona.....	983	1,238	
Alcona.....	335	38,961	37,815
Alcona.....	580	15,581	8,789
Antrim.....	588	10,413	5,237
Arenac.....	388	5,683	
Baraga.....	915	3,056	1,804
Barty.....	580	23,783	25,317
Bay.....	466	56,412	38,081
Benzie.....	340	5,237	3,433
Berrien.....	570	41,285	36,785
Branch.....	504	26,791	27,941
Calhoun.....	720	43,501	38,452
Cass.....	504	20,953	22,009
Charlevoix.....	427	9,636	5,115
Cheyboygan.....	815	11,986	6,524
Chippewa.....	1,608	12,019	5,248
Clare.....	530	7,558	4,187
Clinton.....	580	26,509	28,109
Crawford.....	580	2,962	1,159
Delta.....	718	15,330	6,812
Eaton.....	580	32,094	31,225
Emmet.....	438	8,756	6,638
Genesee.....	640	39,430	39,220
Gladwin.....	540	4,209	1,127
Gogebic.....	1,115	13,166	
Grand Traverse.....	485	13,355	8,422
Gratiot.....	560	28,668	21,936
Hillsdale.....	597	30,680	32,723
Houghton.....	1,000	35,889	22,473

Counties.	Area.	Pop. 1890.	Pop. 1880.
Huron.....	750	28,555	20,089
Ingham.....	652	37,006	33,676
Ionia.....	580	32,901	33,372
Iosco.....	563	15,224	6,875
Iron.....	1,100	4,432	.....
Isabella.....	580	18,784	12,159
Isle Royal.....	215	135	55
Jackson.....	720	45,031	42,031
Kalamazoo.....	576	32,373	34,942
Kalkaska.....	580	5,160	2,357
Kent.....	860	109,922	73,253
Keweenaw.....	350	2,894	4,270
Lake.....	580	6,505	3,233
Lapeer.....	860	29,213	30,138
Leelanaw.....	350	7,444	6,233
Lenawee.....	730	43,443	48,343
Livingston.....	580	20,858	22,251
Luce.....	915	2,455	.....
Mackinac.....	1,045	7,830	2,902
Macomb.....	468	31,813	31,627
Manistee.....	550	24,230	12,532
Manitou.....	120	860	1,334
Marquette.....	2,399	39,521	25,394
Mason.....	500	16,385	10,065
Mecosta.....	580	19,697	13,973
Menominee.....	1,362	33,639	11,987
Midland.....	590	10,637	6,893
Missaukee.....	580	5,043	1,553
Monroe.....	530	32,337	33,624
Montcalm.....	720	32,637	33,148
Montmorency.....	580	1,487	.....
Muskegon.....	520	40,013	26,586
Newagow.....	860	20,476	14,688
Oakland.....	900	41,245	41,537
Oceana.....	540	15,698	11,699
Ogemaw.....	570	5,583	1,914
Ontonagon.....	1,342	3,756	2,565
Oscoda.....	580	14,630	10,777
Oscoda.....	580	1,904	467
Otsego.....	540	4,272	1,974
Ottawa.....	570	35,358	33,126
Presque Isle.....	715	4,687	3,113
Roscommon.....	580	2,033	1,459
Saginaw.....	816	82,273	69,095
Saint Clair.....	705	52,105	46,197
Saint Joseph.....	504	25,356	26,696
Sanilac.....	960	32,589	26,341
Schoolcraft.....	1,216	5,818	1,575
Shiawassee.....	523	30,952	27,059
Tuscola.....	830	32,508	25,738
Van Buren.....	630	30,541	30,807
Washtenaw.....	720	42,210	41,848
Wayne.....	565	257,114	166,444
Wexford.....	580	11,278	6,815

The list of governors of Michigan, with the dates of service, is as follows:

UNDER FRENCH DOMINION.

Samuel Champlain.....1622-35	Count de Frontenac.....1673-82
M. de Montmagny.....1636-47	M. de la Barre.....1682-85
M. d' Ailleboud.....1648-50	M. de Nonville.....1685-89
M. de Lauson.....1651-56	Count de Frontenac.....1689-98
M. de Lauson, Jr.....1656-57	M. de Callieres.....1699-1703
M. d' Ailleboud.....1657-58	M. de Vaudreuil.....1703-25
M. d' Argenson.....1658-60	M. de Beauharnois.....1726-47
Baron de Avangour.....1661-63	M. de Galissonier.....1747-49
M. de Mesey.....1663-65	M. de la Jonquiere.....1749-52
M. de Courcelles.....1665-72	M. du Quesne.....1752-55
M. de Vaudreuil de Cavagnac, 1755-63.	

UNDER BRITISH DOMINION.

James Murray.....1763-67	Frederick Haldimand.....1777-85
Guy Carleton.....1768-77	Henry Hamilton.....1785-86
Lord Dorchester, 1786-96.	

TERRITORIAL GOVERNORS, NORTHWEST TERRITORY.

Arthur St. Clair, 1796-1800.

INDIANA TERRITORY.

William Henry Harrison, 1800-5.

MICHIGAN TERRITORY.

William Hull.....1805-13	George B. Porter.....1831-34
Lewis Cass.....1813-31	Stevens T. Mason.....1834-35

GOVERNORS OF THE STATE.

Stevens T. Mason.....1835-40	Moses Wisner.....1859-60
William Woodbridge.....1840-41	Austin Blair.....1861-64
J. Wright Gordon.....1841-42	Henry H. Crapo.....1865-68
John S. Barry.....1843-45	Henry P. Baldwin.....1869-73
Alpheus Felch.....1846-47	John J. Bagley.....1873-77
William L. Greenly.....1847	Charles M. Crosswell.....1877-81
Epharoditus Ransom.....1848-49	David H. Jerome.....1881-83
John S. Barry.....1850-51	Josiah W. Begole.....1883-85
Robert McClelland.....1852-53	Russell A. Alger.....1885-87
Andrew Parsons.....1853-54	Cyrus G. Luce.....1887-91
Kinsley S. Bingham.....1855-58	Edwin B. Winans.....1891-93

Gov. Winans' term of office expires Jan. 1, 1893. Governor's salary, \$4,000.

BRIEF HISTORIC NOTES OF MICHIGAN.—There are two opinions as to the origin of the name of the State. One is that the name is derived from the Indian words *Mitchi Sawwyegan*, meaning "lake country;" the other is that the word (first given to the lake) is the Indian equivalent of "fish weir" or "trap," which was suggested by the shape of the lake. The present territory had no white inhabitants up to 1641, although French missionaries visited Detroit about 1620. The first settlement was at the Falls of St. Mary in 1641; but no permanent settlement was made until 1668, when Alceuz Dablon and James Marquette founded the Mission of St. Mary at St. Mary. A fort was built at Mackinaw in 1671. A colony was planted at Detroit in July, 1701, by M. Antoine de la Motte Cadillac. France surrendered all its possessions in that region to England by the treaty of Paris in 1763. Michigan was included in Canada until it was surrendered to the United States as one of the results of the Revolutionary War; the formal transfer, however, was not made until 1796, when Michigan became a part of the Northwest Territory. When that territory was divided, May 7, 1800, Michigan became a part of the Indiana Territory, and Gen. William Henry Harrison (afterwards President of the United States) became the first governor of the new territory. Michigan Territory was organized June 30, 1805. A State constitution was adopted in 1835, and on June 15, 1836, Congress voted to admit the territory into the Union as a State, on condition that Michigan should accept the boundary line claimed by Ohio. Its admission was formally declared by act of Congress passed Jan. 26, 1837. The seat of government was transferred from Detroit to Lansing, May 16, 1847.

For numerous other items of recent interest relating to the State, see the article UNITED STATES in these Revisions and Additions.

Progress of population in Michigan by decades: 1810, 4,762; 1820, 8,765; 1830, 31,639; 1840, 212,267; 1850, 397,654; 1860, 749,113; 1870, 1,184,354; 1880, 1,636,937; 1890, 2,093,899.

MIDDLETOWN, a post-village of Newcastle county, Del. It is a great peach shipping depot and contains fruit-preserving establishments.

MIDDLETOWN, a town in New York. Population in 1890, 11,908. See Britannica, Vol. XVI, p. 284.

MIDDLETOWN, a railroad center of Butler County, Ohio, thirty-two miles north of Cincinnati. It contains seven paper-mills, a tobacco factory, flouring mills, foundry, and a paper bag and scissors factory. Population, 7,637.

MIDDLETOWN, a post-borough of Dauphin county, Pa., situated at the junction of Swatara creek and the Susquehanna River. It is noted for

its lumber trade and iron business. It contains the American Tube and Iron Works, Tusquehanna Iron Works, Middletown Car Works, Cameron Iron Furnaces, a furniture factory, and planing mills. Population, 5,104.

MIDDLEWICH, an old-fashioned market town of Cheshire, on the river Dane and the Grand Trunk Canal, twenty-one miles east of Chester. Its salt-manufacture has declined. Population, 3,379.

MIDHAT PASHA (1822-1884), a Turkish statesman, born in Bulgaria in 1822. In 1839 he entered the civil service. In 1857 he suppressed brigandage in Roumelia, and was then made a member of the ministry. In 1860 he was made pasha. After a short service as governor of Bulgaria he was made grand vizier. In 1876 he took part in deposing Abdul Aziz, and again Murad V., who was declared insane. In 1878 he was made governor-general of Syria. In 1881 he was tried for complicity in the murder of Abdul Aziz, and was condemned to death; but by diplomatic intervention the sentence was commuted to banishment to Southern Arabia, where he died in 1884.

MIFFLIN, THOMAS (1744-1800), an American soldier. He was in the Pennsylvania legislature in 1772-73, and in 1774 was a delegate to the Continental Congress. When the news of the fight at Lexington became known he was made major of one of the first regiments organized, and shortly afterward Washington chose him as his first aide-de-camp with the rank of colonel. In 1775 he was made quartermaster-general, in 1776 brigadier-general, and in 1777 major-general. In 1783 he became a member of Congress, and in 1785 was in the legislature. In 1787 he was a delegate to the convention that framed the United States constitution, and from 1788 to 1790 was a member of the supreme executive council of Pennsylvania. From 1790 to 1799 he was governor of the State, and then till his death was a member of the assembly.

MIFFLINBURG, a post-borough of Union county, Pa. It has manufactories of flour and lumber, and deposits of anthracite and bituminous coal, limestone and iron.

MIGNE, JACQUES PAUL, to whom Roman Catholic theology owes a great debt of gratitude, was born at St. Flour in Cantal, Oct. 25, 1800, and died in Paris on his seventy-fifth birthday. He was educated at the seminary at Orleans, was ordained priest in 1824, and served some time as curate at Puiseaux in the diocese of Orleans. A difference with his bishop about a book on the liberty of the priests drove him to Paris in 1833, where he started "L'Univers." In 1836 he sold the paper, and set up a great publishing house at Petit Montrogue, near Paris, which gave to the world, besides numerous other works of theology, *Scripture Sacre Cours Completus* and *Theologie Coursus* (each 28 vols.), *Collection des Orateurs Sacres* (100 vols.), *Patrologie Coursus Completus* (Latin series 221 vols., 1st Greek series, 104 vols., 2nd series, 58 vols.), and the *Encyclopedie Theologique* (171 vols.) Unfortunately, these editions were prepared too hastily, and do not possess critical value. The Archbishop of Paris, thinking that the great undertaking had become a mere commercial speculation, forbade it to be continued, and, when the indefatigable director refused to obey, suspended him. A great fire, however, put an end to the work in February, 1868.

MIGNET, FRANÇOIS AUGUSTE MARIE (1796-1884), a great French historian, born at Aix in Provence, May 8, 1796, studied at Avignon, and then studied law at Aix with Thiers. In 1821 he went to Paris, and began to write for the *Courrier Français*, and to lecture on modern history at the Athénée. In the spring of 1824 appeared his *Histoire de la Révolution*

Française de. Mignet joined the staff of the *National*, and with Thiers signed the famous protest of the journalists on July 25, 1830. After the revolution of 1830 he became Keeper of the Archives at the foreign office, but lost this in 1848. In 1833 he went on a confidential mission to Spain, and used the opportunity to explore the famous Simancas Archives. Elected to the Academy of Moral Sciences at its foundation in 1832, he succeeded Comte as its perpetual secretary in 1837, and was elected to fill Raynouard's chair among the Forty in 1836. He died March 24, 1884, within three months of Henri Martin. Mignet was the first great specialist in French history who devoted himself to the complete study of particular periods, and in his work he displayed a marvelous mastery of documents.

MIKLOSICH, FRANTZ VON, the greatest of Slavonic scholars, born at Lutzenberg, in the Slovenian part of Styria, Nov. 20, 1813, died in 1891. After studying law at the University of Gratz, he went in 1838 to Vienna to practice as an advocate, but was led by Kopitar to the study of philology, and in 1844 obtained a post in the Imperial Library. From 1850 to 1855, he was professor of Slavonic at Vienna, in 1851 being elected to the academy of sciences, and in 1869 made a "Ritter." His works, nearly thirty in number, include *Radices Lingue Poloslovenice*; *Lexicon Lingue Paloposlovenice*; *Vergleichende Grammatik der Slawischen Sprachen* (4 vols.), which have done for Slavonic what Grimm and Diez have done for the German and Romance languages; *Die Bildung der Slawischen Personennamen*; *Ueber die Mundarten und die Wanderungen der Zigeuner Europas* (12 parts); *Rumänische Untersuchungen*, and *Etymologisches Wörterbuch der Slawischen Sprachen*.

MILAN, the county-seat of Sullivan county, Mo., 250 miles northwest of St. Louis. It has deposits of fireclay, mineral paint, building-stone, and coal, and contains a woolen mill, flour-mills, and cooperage.

MILAN, a railroad junction of Gibson county, Tenn., ninety miles northeast of Memphis. It has cotton and planing mills, a high-school and a college.

MILBURN, WILLIAM HENRY, an American clergyman, born in Philadelphia, Sept. 26, 1823. When a boy, although of defective sight, he studied at Illinois College; at the age of 20 became a Methodist preacher; was chaplain to Congress; in 1859 went to England and lectured with success; on his return was ordained in the P. E. Church, but in 1872 returned to Methodism. He is known as the "blind preacher," and has published some able works.

MILEAGE, in the United States, fees paid to officials, and in particular to members of Congress, for their traveling expenses, at so much per mile. There is a fixed table of mileage, and the largest allowance paid is \$1,440; the total annual cost, for both houses of Congress, is nearly \$150,000. In all countries of Europe, except Britain, the same system prevails with regard to members of the popular chambers, at least, they being paid either their traveling expenses or a fixed annual sum.

MILES, NELSON APPLETON, an American soldier, born in 1839. In 1861 he entered the volunteer service of the United States as lieutenant, and in 1862 became lieutenant-colonel, the same year colonel, brigadier-general in 1864, and major-general in 1865. He became colonel in the regular Army in 1865, and served in this capacity till the end of the war. He then served on frontier duty until 1880, when he was made brigadier-general and placed in command of the department of the Columbia. In 1885 he was assigned to the department of the Missouri, and in 1886 was transferred to Arizona.

MILFORD, a post-village and seaport of New Haven county, Conn., on Long Island Sound. It manufactures straw goods. Population, 3,800.

MILFORD, a post-borough of Kent county, Del., on Missippion River. It is a shipping point for farm and orchard produce.

MILFORD, a post-village of Oakland county, Mich., thirty-five miles northwest of Detroit. It has a foundry and several manufacturing.

MILFORD, a post-village of Hillsborough county, N. H., fifty miles north of Boston, to which city it ships 220,000 gallons of milk annually. It has manufactures of picture and mirror frames, tassels, furniture, men's boots and shoes, and knitting-cotton. Here are granite quarries.

MILFORD-HAVEN, a harbor of Pembrokeshire, South Wales, one of the deepest, safest, and most commodious in Great Britain. It is formed by an inlet of St. George's channel, northwest of the entrance to British channel. Its opening is toward the south, but after penetrating a short distance inland it changes its direction and runs east, branching off into numerous bays, creeks and roads. It is defended by two batteries, and on the northwest extremity of the entrance is St. Anne's Head, on which are three light-houses with fixed lights. The length of the haven is about fifteen miles; average breadth, two miles. The tide rises from 28 to 30 feet. The harbor is completely landlocked, and has so great an area of deep anchorage that the whole shipping of the empire might ride here in safety. The access is easy, and the egress can be accomplished even in head-winds. It has substantial docks and piers, and is a great resort for shipping. See *Milford, Britannica*, vol. XVI, p. 294.

MILITARY ACADEMIES. The *Military Academy of the United States* is at West Point, N. Y., on the Hudson River. It was founded by act of Congress, March 16, 1802. At first it consisted of fifty cadets, forty of them being attached to the artillery and ten to the engineer service. This was the nucleus to which various additions were made until 1812, when the institution became substantially what it is at present. The staff of instruction and government consists of, 1. The superintendent of instruction and military staff; 2. The commandant of cadets and six assistants; 3. eight non-commissioned officers, and one professor with thirty-two assistants. Each Congressional district and territory is entitled to one cadetship, and the President appoints ten cadets annually, who must be between the ages of 17 and 22. Those admitted bind themselves, by special articles, to serve the United States for eight years unless sooner discharged. The course of study, which is very thorough, especially in the mathematical department occupies four years, and the discipline, intended to secure habits of prompt, implicit obedience to lawful authority, as well as habits of neatness, order and regularity, is more strict even than that of the army, or that in any similar institution. At graduation the class is divided into three grades, according to scholarship, and recommended for promotion, according to this schedule, in different corps, and commissions for the rank of second lieutenant conferred.

In order to superadd a special professional training for the graduates of the military academy, and also to give the needed opportunity to those who have received their commissions from civil life or from the ranks of the army, post-graduate schools have been opened at Fortress Monroe, Fort Leavenworth, and at Willet's Point. These schools are also maintained by the United States government. The *School at Fortress Monroe, Va.*, was commenced

in 1867. It has a two-years' course. It is intended for subalterns of artillery, yet officers of other arms of the service have, by special permission of the secretary of war, been educated there. The *School at Fort Leavenworth, Kan.*, began in 1882. It is designed for the training of infantry and cavalry officers. The *School at Willet's Point, N. Y.*, was established in 1865. It is intended for the education of officers of the engineer corps and also of artillery officers. The course is for two years. Special attention is given to permanent works, their construction and management; also to torpedoes and the electrical service.

OTHER MILITARY COLLEGES AND SCHOOLS.—The most notable military school maintained by a State is the *Virginia Military Institute*. It ranks next to the United States Academy. This school is located at Lexington, Va. It has eight professors, and is modelled after the West Point school in its general plan, instruction and discipline. It has usually about 150 students.

The *Kentucky Military Institute* is similar. It has its existence since 1846, first at Frankfort, and now



WEST POINT PARADE GROUNDS

at Farmdale, Ky. It has eleven professors and instructs usually about 130 students. There are a number of other military schools, especially in the southern States; some are also maintained privately in New York, Massachusetts, Vermont, Pennsylvania, Ohio, and Michigan.

Since 1883 the general government details forty non-commissioned officers of the army to act as professors of military science and tactics at certain designated colleges which had accepted from the United States certain grants of land for educational purposes. It had been stipulated in the grants, and made obligatory upon each college so helped, to embrace military training in its course of instruction. These officers are distributed among the several States as nearly as possible according to the population. Recently, however, *State institutions* which introduce a military branch of instruction are preferred in the distribution of these military instructors.

During the year ending Sept. 30, 1888, forty institutions in different parts of the Union availed themselves of the opportunity of giving instruction in military science, with practice in military drill, to such of their pupils as chose to receive it. The whole number of students over 15 years of age attending these institutions was 7,791. Of this num-

ber about 4,000, or 51 per cent., attended infantry drill. During the previous year the same system had been pursued. The total number of students was, however, less, and only 49 per cent. had attended the drills. This shows that the interest of the students in military matters is increasing.

MILITARY LAW. See ARTICLES OF WAR in these Revisions and Additions.

MILITELLO, a town of Sicily, twenty-one miles southwest of Catania. Population, 10,505.

MILITIA (from Latin *Miles*, a soldier), has now the acquired meaning of the domestic force for the defense of a nation, as distinguished from the regular army, which can be employed at home or abroad in either aggressive or defensive operations. Every nation has a reserve, under its military law, upon which its defense would fall on the discomfiture of the regular army; but the system differs in each country, and with the exception perhaps of the United States during peace, none are formed on the model of the British militia. The United States militia is only national when in the actual service of the United States Government. Congress has constitutional power to provide for the organization and equipment of such troops during such time, and the President is then commander-in-chief, and is empowered to call them out by orders to the officers appointed by the respective States. While so employed they receive the pay, rations, etc., of the regular army. Various acts of Congress require the enrollment of all non-exempted able-bodied male citizens between 18 and 45, in every State, and prescribe the manner of organization, discipline, etc. The actual or organized militia consisted of, in 1875—

General officers.....	119
General staff officers.....	883
Regimental, field, and staff officers.....	1,065
Company officers.....	4,008
Non-commissioned, including musicians and privates.....	78,649
Aggregate.....	84,724

The regularly organized and uniformed active militia of the several States in the year 1885 aggregated 84,739 men; in the year 1886 the number was 92,734; in 1887 it had increased to 100,837, and in 1888 it had an available force of 106,814 men.

According to the laws of several of the States, the State militia is required to go into camp for one week in each year. During this time the men have to conduct themselves like troops of the regular army. Whenever the State authorities request it, officers of the regular army are detailed to inspect these encampments and give instruction to the militia. These officers make afterwards minute reports of the results of their observations to the Adjutant-General of the United States army. During the year ending Sept. 30, 1888, such encampments were held in fifteen States, including among them the three largest in the Union.

MILK CELLARS. A cellar dug to the depth of twelve feet, and, having a sub-cellar beneath the upper one, is believed to be the best for milk in either summer or winter. There is a certain depth in the soil where the temperature is even through the whole year. This point varies very little from seven feet from the surface, and below this an excavation from which the air can be excluded will be the best place for a cellar for keeping articles which are perishable in a warm temperature. Such a cellar makes safe storage for fruits and vegetables or for those domestic supplies which require such protection. It can easily be kept safe from dampness by means of a small quantity of quicklime in a dish, which will absorb the moisture;

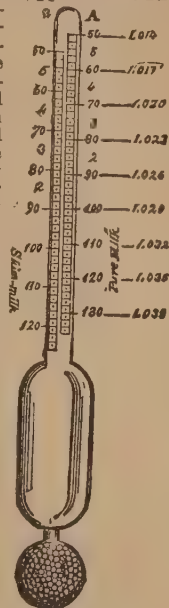
and the purity of the air may be preserved by washing the brick or stone walls with fresh lime occasionally. The upper part of the cellar will afford every convenience for the dairy-work, as churning, etc. No part that is below the surface and in contact with the soil, should be made of timber.

MILK, ADULTERATION OF. For general article on MILK, see *Britannica*, Vol. XVI, pp. 301-306. The adulteration of milk has recently for obvious reasons, become a question of great importance especially in the United States. In order to furnish the reader with a practical as well as scholarly discussion as to the principal methods used in this country in testing the quality of milk, we insert by permission some interesting notes from a recent paper by Henry A. Mott, Jr. E. M., Ph. D. of New York, published in the *Scientific American*.* Dr. Mott first invites attention to the chief appliances for detecting the adulteration of milk.

The CENTESIMAL GALACTOMETER was invented by Dinocourt: it is shown in the figure. The stem of the instrument has two scales: one for pure milk, the other for skimmed milk; the scale A, in part colored yellow, serves to weigh the milk with its cream; the first degree on the top of the scale is marked 50, which corresponds to the sp. gr. 1.014. The following marks extend from 50 to 100 (sp. gr. 1.029), and over. Each degree starting from one hundred in mounting up to 50, represents a hundredth of pure milk; the degrees formed by a line are equal, as 50, 52, 54, etc.; the degrees formed by a dot are unequal, as 81, 83, 85, etc. To illustrate by an example: If the galactometer is sunk to the 85th degree, that will indicate 85 hundredths of pure milk, and consequently that 15 hundredths of water has been added to this milk; if sunk to 60 degrees, that will indicate 40 hundredths of water, or four-tenths of water added. If it is desired to count by tenths, it is only necessary to notice that the first tenth is white, that the second is colored yellow, the third white, the fourth yellow, and that the fifth is also white; toward the middle of each tenth the figures 1, 2, 3, 4, 5 are placed to indicate their order.

The scale, *a*, is in part colored blue, and is destined to weigh skim milk; it is, like the first, divided into hundredths (100 degrees), of which the first 50 have been cut off as useless, as in the case of the other scale, each degree commencing from 100 to 50 and mounting upwards represents a hundredth of pure skimmed milk, consequently the manner of estimating the quantity of water added to skim milk is absolutely the same as for pure milk with cream. The degree 130 corresponds to a specific gravity 1.038, the degree 120 to 1.035, the degree 110 to 1.032, the degree 100, which is the standard, to 1.029, the degree 80 to 1.023, the degree 70 to 1.020, the degree 60 to 1.017 and the degree 50 to 1.014.

* For an extended discussion of the subject the professional inquirer is referred to *Scientific American* in loc.



Another Centesimal Galactometer was invented by Chevallier; it is similar to the above instrument. It serves to determine the specific gravity of cream, milk, and skimmed milk. This instrument is used in connection with the creamometer. The specific gravity of the milk not skimmed is first determined, noting the temperature, then the volume of cream is ascertained by means of the creamometer, and finally the specific gravity of the skimmed milk is determined, noting the temperature.

From the data obtained, by referring to tables compiled by Chevallier, the additional water contents of the milk is ascertained.

THE LACTODESIMETER.—This is an instrument differing from the galactometer just described only in the division of its scale. It is the production of Bouchardat and Quevenne, and is represented in the figure. This instrument, like all the densimeters, gives immediately and without calculation the density of the liquid in which it is plunged; its scale comprises only the densities which may be presented by pure or adulterated milk. The shaft bears three distinct graduations. The first, which is the middle one in the figures, contains the whole numbers intermediate between 14 and 42. In reality, the whole numbers comprised between 1'014 and 1'042 ought to be inscribed; but on account of the small size of the shaft the two first figures have been suppressed which do not change. If, consequently, the instrument is sunk in a liquid up to the figure 29, this signifies that a litre of this milk weighs 1'029 grams, and that its density is consequently 1'029. The instrument has been graduated for the temperature of $+15^{\circ}$ C. It is necessary, therefore, for obtaining an *exact* indication, to be assured the liquid under examination is at this temperature. In the contrary case, it may be brought back to this degree by plunging the gauge containing the milk in water that is cold, or in lukewarm water, according as the thermometer is above or below $+15^{\circ}$. The scale on the right is employed when it is certain that the milk acted on is not skimmed. This scale shows what are the variations of the density of milk in proportion as water is added, and the figures $\frac{1}{10}$, $\frac{2}{10}$, etc., indicates that the liquid operated upon has been mixed with this proportion of water. The scale on the left contains the same indications relative to skimmed milk. Milk is marked pure on this instrument, between the specific gravities 1'030 and 1'034, skimmed milk is marked pure between the gravities 1'034 and 1'037.

THE LACTOMETER. The original lactometer was discovered by Prof. Edmund Davy in 1821. It is represented in the figure. It is made of brass, and consists of a pear-shaped bulb, at the top of which is a graduated stem, and at the bottom a brass wire, to the end of which a weight is screwed. This instrument is only intended for skimmed milk, and the 0 mark corresponds to the sp. gr. 1'035, which, according to Davy's experiments, represents the lightest genuine skimmed milk. The dots in the figures, which extend from 0 to 35, indicate parts of water in 100 parts skimmed milk at 60° .

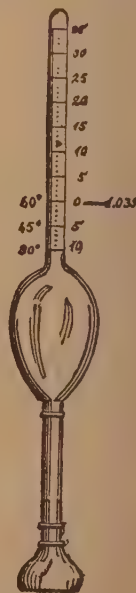
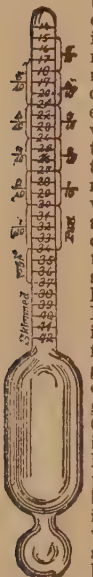
Who invented the lactometer for testing milk I am unable to ascertain; one thing is certain, however, the one who first divided the scale from 0 water to 100 pure milk was, of course, the inventor. Of the various lactometers that have been in use, the only

difference was the specific gravity represented by the 100 degree of the scale. The specific gravity corresponding to the 100 degree on the centesimal galactometer invented by Dinocourt, as I have already stated, was 1'029, which was intended to represent the proper minimum. This sp. gr. has been adopted by the Board of Health of New York as the standard for their lactometers.

The old standard adopted by the milk dealer was 1'030; this was changed by Dr. Chilton to 1'034, and has gradually dropped to 1'033. So that the standard now employed by the milk dealers to secure for themselves pure milk is 0'004 higher than that adopted by the Board of Health.

In graduating the board of health lactometer shown in the figure, the 100° is placed at the standard 1'029, and 0 at 1'000, the gravity of water, the intermediate spaces being divided into 100 equal divisions. Great care should be taken to deter-

mine with absolute accuracy the 0 degree and the 100 degree; other points may also be determined, but they are not absolutely necessary if the space is properly divided.



The point to which the lactometer sinks in the milk under examination indicates the percentage of milk in 100 parts. Thus, if the lactometer sinks to 80, the milk must consist of, at least, 20 per cent. of water and 80 of milk. This assumes the original milk to have had a specific gravity of 1'029; but, if the milk had originally a gravity of 1'034, it would require 16'67 per cent. of water to bring it down to 1'029, and 20 per cent. more water to lower it to 80° on the lactometer. The temperature at which examinations are made with the lactometer should be 60° F., for *exact* determinations, as the instrument is graduated for that temperature. If it is only necessary to establish the *fact* of an adulteration by water, the milk may be cooled to a temperature below 60° F., which

an expert can easily ascertain by the sense of taste, etc.—the lower the milk is cooled the more dense it becomes; consequently, if the lactometers should sink below 100 in a sample of milk known to be below 60° F., sufficient evidence to establish the fact of its adulteration is indicated. A sample of milk tested by Dr. Chandler, of New York, which stood at 100 by the lactometer at 60° F., was found to stand at 106 at 44° F., at 98 at 66° F., at 90 at 80° F., and at 74 at 100° F.

VALUE OF THE DEGREES OF THE BOARD OF HEALTH LACTOMETER IN SPECIFIC GRAVITY.—BY DR. WALLER.

Lactometer.	Gravity.	Lactometer.	Gravity.	Lactometer.	Gravity.	Lactometer.	Gravity.
0	1.00000	31	1.00899	61	1.01769	91	1.02639
1	1.00029	32	1.00928	62	1.01798	92	1.02668
2	1.00058	33	1.00957	63	1.01827	93	1.02697
3	1.00087	34	1.00986	64	1.01856	94	1.02726
4	1.00116	35	1.01015	65	1.01885	95	1.02755
5	1.00145	36	1.01044	66	1.01914	96	1.02784
6	1.00174	37	1.01073	67	1.01943	97	1.02813
7	1.00203	38	1.01102	68	1.01972	98	1.02842
8	1.00232	39	1.01131	69	1.02001	99	1.02871
9	1.00261	40	1.01160	70	1.02030	100	1.02900
10	1.00290	41	1.01189	71	1.02059	101	1.02929
11	1.00319	42	1.01218	72	1.02088	102	1.02958
12	1.00348	43	1.01247	73	1.02117	103	1.02987
13	1.00377	44	1.01276	74	1.02146	104	1.03016
14	1.00406	45	1.01305	75	1.02175	105	1.03045
15	1.00435	46	1.01334	76	1.02204	106	1.03074
16	1.00464	47	1.01363	77	1.02233	107	1.03103
17	1.00493	48	1.01392	78	1.02262	108	1.03132
18	1.00522	49	1.01421	79	1.02291	109	1.03161
19	1.00551	50	1.01450	80	1.02320	110	1.03190
20	1.00580	51	1.01479	81	1.02349	111	1.03219
21	1.00609	52	1.01508	82	1.02378	112	1.03248
22	1.00638	53	1.01537	83	1.02407	113	1.03277
23	1.00667	54	1.01566	84	1.02436	114	1.03306
24	1.00696	55	1.01595	85	1.02465	115	1.03335
25	1.00725	56	1.01624	86	1.02494	116	1.03364
26	1.00754	57	1.01653	87	1.02523	117	1.03393
27	1.00783	58	1.01682	88	1.02552	118	1.03422
28	1.00812	59	1.01711	89	1.02581	119	1.03451
29	1.00841	60	1.01740	90	1.02610	120	1.03480
30	1.00870						

The following table by De Voelcker (with an addition by Dr. Chandler, of the 2d column), illustrates the effects of watering and skimming:

	UNSKIMMED.			SKIMMED.		
	Pure milk.	Sp. Gr.	Lact.	Pure milk.	Sp. Gr.	Lact.
10 per cent. water added.	1.0314	108	1.0387	117		
20 "	1.0295	102	1.0308	106		
30 "	1.0257	88	1.0265	91		
40 "	1.0233	80	1.0248	86		
50 "	1.0190	65	1.0208	72		
60 "	1.0163	56	1.0175	60		

Thus it is seen that with a sample of pure milk of sp. gr. 1.0314 more than 10 per cent. of water could be added before the gravity is reduced to 1.029 or 100 on the lactometer; and after skimming, considerable more.

That the specific gravity 1.029, is the true minimum standard for pure whole cow's milk, I think I have already fully demonstrated, yet it is interesting to bear in mind that it has been confirmed by "Müller, Fleischmann, Goppelsroeder, Krämer, and other specialists."

Müller says: "From more than 6,000 notes by Quevenne and Bouchardat, the minimum is 1.029, and the maximum 1.033. For the hospitals and public institutions in Paris, the minimum is 1.030." He further says: "If, . . . 'we go through all Europe, from country to country, from place to

place, from dairy to dairy, from Alp to Alp, with the lactodensimeter in hand, and mix at times the milk of several cows together which have been milked under conditions sufficiently touched upon, we shall find that the milk which is divided as a trade commodity from the physiological milk weighs between 1.029 and 1.033."

Let us consider, now, if there are any objections to the use of the standard lactometers for the detection of adulteration. I have already stated that a sample of perfectly pure cow's milk, possessing a high specific gravity, can be considerably added with water, and the lactometer is unable to detect the fraud. The question naturally arises, is there any method by which the fraud can be detected? The answer comes, unfortunately, no—owing to the variation in the proportion of each constituent, a proper margin has to be left for the maximum and minimum proportions, and between these limits the fraud can be perpetrated, and defy all science to detect it.

Milk may be skimmed, which will increase the specific gravity of the fluid; it may then be watered and the sp. gr. reduced to the standard of the lactometer, or the sp. gr. may be still further reduced, and, by the addition of some solid substances, such as sugar or salts, increased to the standard specific gravity. The question naturally arises here, can the lactometer detect such adulteration? To answer this question we must first inquire into the method adopted, where the lactometer is used to detect adulteration. It is to be supposed that an expert commissioned to examine milk for adulteration, using as a means the lactometer, will perform the test which is to be made in connection with the senses—that is to say, the sample under examination should be examined as to its opaqueness and color, its taste and odor, etc. If, on the contrary, he performs the task automatically, simply taking the degree of the instrument, noting the temperature, without examining the sample otherwise, the lactometer itself will not detect such adulteration; but such an experimenter is not fit or competent to make such investigations; for, no matter what the method of examination may be, the common sense is always required to accomplish the object in view. I say without fear of successful contradiction, that if the lactometer is used in connection with the senses, that is to say, regarding the flow of milk from the bulb of the instrument, observing its opacity and color, as also examining as to flavor and odor of the sample under examination, the lactometer will detect all the practical frauds perpetrated by milkmen. In my opinion there is not one unprejudiced person, with the experience and education that the milk expert should have, that cannot distinguish a fair sample of pure milk from a fair sample of skimmed milk or cream; and if such is the case, how readily could be detected an adulterated sample.

In the first part of this paper I stated that the indications of the lactometer are infallible; this is the case; for if a sample of milk should indicate a degree less than the standard, there is indisputable evidence that the sample has been tampered with.

MILK WORTS (so called from the milky juice), various species of plants belonging to the natural order Polygalææ or Polygalaceæ. The order comprises about twenty genera and 500 species, which are widely distributed over the tropical and sub-tropical world; several species are natives of North America and Europe. They are herbaceous plants or shrubby. The leaves are usually simple and destitute of stipules; the flowers irregular. They are generally tonic and slightly acid, and some are very astringent. The common Milkwort

(*Polygala vulgaris*) is a small perennial plant, with an ascending stem, linear-lanceolate leaves, and a terminal raceme of small beautiful flowers. It varies in size and in the flowers and leaves. *P. Senega* is a North American species, with erect simple tufted stems about one foot high, and terminal racemes of white flowers. The root is the Snake Root of the United States, famous as an imaginary cure for snake-bites, but really possessing important medicinal virtues. See *Britannica*, Vol. XXI, p. 189. The root of *P. poaya*, a Brazilian species with leathery leaves, is an active emetic. *P. tinctoria*, a native of Arabia, furnishes a blue dye like indigo. Another medicinal plant of the order is the Kattany Root.

MILL. See *Britannica*, Vol. IX., pp. 343-47.

MILL (Lat. mille, a thousand), in the United States, the tenth part of a cent the thousandth part of a dollar. As a coin it has no existence.

MILLAIS, SIR JOHN EVERETT, a celebrated English painter, born June 8, 1829. At the age of seventeen he exhibited at the Royal Academy his *Pizarro Seizing the Inca of Peru*. He has won, perhaps, the front rank among contemporary English painters by his popular subject compositions, such as *The Black Brunswicker* and *The Huguenot Lovers*, and for his portraits, for which latter he has received as high as two thousand dollars for a full-length. He has also achieved decided success in landscape, a noted example of which is his *Over the Hills and Far Away*. He carries talent very near the line of genius, and is unsurpassed in the matter of technical skill.

MILLBROOK, a manufacturing town of Durham county, Ontario, eighteen miles from Port Hope.

MILLBURY, a post-village and railroad junction of Worcester county, Mass., on Blackstone River, six miles south of Worcester. It manufactures cotton and woolen goods, stockings, cutlery, castings, shoes, whips, lumber, and carriages. Population, 4,427.

MILLEDGE, JOHN (1757-1818), a United States statesman. He took part in the Revolutionary war on the side of the colonies, and was appointed attorney-general of Georgia in 1780. From 1792 to 1802 he was a member of Congress, except in the years 1799 and 1800, and then till 1806 was governor of his State. From 1806 to 1809 he was a United States Senator.

MILLEDGEVILLE, the former capital of Georgia, a city and the county-seat of Baldwin county. It is in a cotton-growing region, has cotton manufactories, the State lunatic asylum, State penitentiary, and the Middle Georgia Military and Agricultural College. Population, 3,306.

MILLER, CINCINNATUS HINER (JOAQUIN), an American poet, born in 1841. He began the practice of law in 1863, and from 1866 to 1870 was judge of Grant county, Oregon. He then devoted himself entirely to literature, and has written several plays, including *The Danites*. Among his poems are *Songs of the Sierras* (1871); *Songs of the Sunlands* (1873); *Songs of the Desert* (1875); and *Songs of the Mexican Seas* (1887). His prose works are *The Baroness of New York* (1877); *The Danites in the Sierras* (1881); *Shadows of Shasta* (1881); *Memories of Rime* (1884); and *'49, or the Gold Seekers of the Sierras* (1884).

MILLER, JOSEPH, an English comedian, born about 1684, died in 1738. In 1739 a collection of stale jokes was made by John Mottley and published as *Joe Miller's Jests*, and it is by this work that he is best known.

MILLER, SAMUEL, a distinguished American divine, born near Dover, Del., in 1769, died at Princeton, N. J., in 1850. He was professor of ecclesiastical

history at Princeton, from 1813 to 1849. He wrote numerous polemical treatises, and some valuable historical and biographical works.

MILLER, WARNER, an American statesman, was born in Oswego county, N. Y., Aug. 12, 1838. He served with credit in the civil war; was elected to the New York assembly in 1874, to Congress in 1878, and became United States Senator in 1881. He was the Republican nominee for governor of New York in 1888. He is president of the Nicaragua Canal Company.

MILLER, WILLIAM ALLEN, an English chemist, born at Ipswich in 1817, died in 1870. He is best known by his valuable *Elements of Chemistry*.

MILLER, WILLIAM HALLOWES (c 1801-1880), an English mineralogist and physicist. In 1843 he superintended, by order of parliament, the construction of standards of weight and length, the old standards having been destroyed by fire. In 1870 he served on the international commission upon the metric system. He was a prominent member of the principal scientific societies of the world.

MILLERSBURG, the county-seat of Holmes county, Ohio. It contains a flour-mill, a foundry, and a machine shop.

MILLERSVILLE, a post-village of Lancaster county, Pa. It contains the Millersville State Normal School.

MILLIARD, the French collective name for a thousand millions; familiar in connection with the five milliards of francs (5,000 millions of francs, or \$1,000,000,000) paid by France as war indemnity to Germany in 1871-73.

MILLIKEN'S BEND, a village of Louisiana, about 15 miles above Vicksburg, the scene of an engagement in June, 1863, between the Confederates under General McCullough, and a body of colored troops, in which the former, owing to the timely arrival of Porter's fleet, were repulsed.

MILLS, CLARK (1815-1883), an American sculptor. For several years prior to 1835 he was in the stucco business in Charleston, S. C., and then resolved to try cutting in marble. His first work was a bust of John C. Calhoun, for which he received a gold medal from the city council, and it was placed in the city hall. Subsequently he executed busts of several eminent men of South Carolina, and in 1848 made the model for the equestrian statue of Andrew Jackson, which stands in Lafayette Square, Washington, D. C. Mr. Mills has since executed several other popular statues, besides many busts.

MILLS, SAMUEL JOHN (1783-1818), an American clergyman. In 1812-13 he was exploring agent of the Massachusetts and Connecticut Missionary Societies, and in 1814-15 missionary and Bible agent. In 1817 he was chosen to explore the coast of western Africa in behalf of the American Colonization Society. He reached Africa in the early part of 1818 and after two months on that continent began his homeward voyage. He died while at sea.

MILLTOWN, a post-town in Charlotte county, N. B., on St. Croix River. It is a great lumber depot.

MILMORE, MARTIN (1844-1883), an American sculptor. He entered the studio of Thomas Ball in 1860, and several years later opened a studio of his own in Boston. Among his works are soldiers' and sailors' monuments in several cities, busts of Pope Pius IX., Charles Sumner, Wendell Phillips, Ralph Waldo Emerson, Longfellow, Theodore Parker and George Tickner, besides the ideal figures *Ceres*, *Flora*, *Pomona*, *America* and *Weeping Lion*.

MILNE-EDWARDS, HENRI, a French naturalist, born at Bruges, Oct. 23, 1800, died July 29, 1885. His father was an Englishman. Milne-Edwards studied medicine at Paris, where he took his degree of M. D. in 1823, but devoted himself to natural his-

tory. He was elected in 1838 member of the Académie des Sciences in the place of Cuvier. In 1841 he filled the chair of Entomology at the Jardin des Plantes, and in 1844 became professor of zoology and physiology. He published numerous original memoirs of importance in the *Annales des Sciences Naturelles*, a journal he himself assisted in editing for 50 years.

His *Elements de Zoologie* had an enormous circulation, and long formed the basis of most minor manuals of zoology published in Europe. His *Lectures on the Physiology and Comparative Anatomy of Man and the Animals* (14 vols.) have a great permanent value for their immense mass of details, and copious references to scattered sources of information. His researches in the distribution of the lower invertebrates led him to the theory of centers of creation; and to this he adhered throughout life, in spite of the general acceptance of the newer and larger views of Darwin by his fellow-scientists. His elder brother, Frederick William, was almost equally celebrated. He founded the Ethnological Society in Paris, and is considered the father of ethnology in France.

MILNER, ISAAC, an English author and scholar, born near Leeds in 1751, died in 18'0. He was a brother of Joseph Milner, whose *Church History* he brought down to a later date.

MILNER, JOSEPH, an ecclesiastical historian, born near Leeds in 1744, died Nov. 15, 1797. He studied at Catharine Hall, Cambridge, and afterwards became well known as head-master of Hull grammar-school. He was vicar of Forth Ferryby seven miles from Hull, and lecturer in the principal church of the town, and in 1797 became vicar of Holy Trinity Church. Milner's principal work is his *History of the Church of Christ*, of which he lived to complete three volumes, reaching to the 13th century; a fourth volume coming down to the 16th century, was edited from his MSS.

MILREIS, or MILRAES, a Portuguese silver coin and money of account, contains 1,000 reis. The coin is commonly known in Portugal as the corôa, or "crown," and is the unit of the money system in that country. It is also used in Brazil.

MILTON, a city, the county-seat of Santa Rosa county, Fla., on Blackwater River. It contains foundries, and a dry dock, and has a large lumber trade.

MILTON, a post-village of Norfolk county, Mass., nine miles south of Boston. Ice and building-stones are here obtained, and paper, leather, chocolate, and rubber-goods are manufactured. Market gardening is largely carried on in the vicinity. Population, 4,278.

MILTON, a post-borough of Northumberland county, Pa. It has manufactories of lumber, and contains car-works, machine shops, agricultural works, and foundries; also a rolling-mill and a nail factory. Population, 5,317.

MILWAUKEE, a city of Wisconsin, the commercial metropolis, railroad center, and port of entry of the State. Milwaukee is one of the greatest wheat markets in the country; it has extensive manufactories of iron, flour, malt liquors, and leather. From its elevated position it overlooks Lake Michigan. It is noted for the healthfulness of its situation. Population in 1890, 203,979. See *Britannica*, Vol. XVI, p. 340.

MINAS, the capital of a wild, mountainous province (area, 4,844 square miles; population, 23,000), of the same name in southern Uruguay, seventy-five miles by rail northeast of Montevideo. Population, 7,000.

MINDEN, a post-village, the capital of Webster parish, in the northwestern part of Louisiana.

Cotton and lumber are the chief articles of export.

MINDERERUS SPIRIT, a valuable diaphoretic, much used in febrile diseases. It is prepared by adding ammonia or the carbonate of ammonia to acetic acid till a neutral liquid is obtained. It is sometimes applied hot on flannel in cases of mumps, while it has also been employed as an eyewash in chronic ophthalmia.

MINEOLA, a flourishing town of Texas, and an important railroad junction, situated about a hundred and twelve miles west of Shreveport, Louisiana, at the intersection of the Texas and Pacific and the Missouri Pacific railroads.

MINER, ALONZO A., an American clergyman and temperance advocate, born in New Hampshire in 1814. He has held many important offices connected with education; and has been a voluminous writer, especially in the anti-slavery and temperance causes. He was president of Tufts College from 1862 to 1875.

MINERAL POINT, a city of Iowa county, Wis. It contains grist-mills, foundries, a car-shop, and zinc and lead furnaces. Population, 2,694.

MINERAL WOOL. When a jet of steam is allowed to escape through a stream of liquid slag, the slag is blown into very fine white threads, called "mineral wool," which is used as a covering for steam-pipes and steam-boilers; as a deafening for floors and buildings; and, generally, as a non-conductor of heat.

MINERSVILLE, a post-borough and a railroad junction of Schuylkill county, Pa., on the west branch of the Schuylkill River. Coal-mining is the chief industry, and the town contains water-works, a fire department, foundries and an anthracite furnace. Population, 3,502.

MINGHETTI, MARCO, an Italian statesman, Cavour's disciple and successor as leader of the Italian Right, born Sept. 8, 1818, died at Rome Dec. 10, 1886. He supplemented a brilliant course at his university by a prolonged tour in France, Germany and Great Britain. With the election in 1846 of Pope Pius IX, Minghetti started a journal in aid of his country's regeneration. In 1859-60 he was Cavour's secretary for foreign affairs. His next post was that of minister of the interior, and on Cavour's death in 1861 he was regarded as his ablest representative in the Italian chamber. In 1863 he became prime-minister, in 1864 he concluded with the Emperor Napoleon the "September Convention." In 1868 he was Italian minister in London, and thereafter minister of agriculture. In 1870 the collapse of the Second Empire brought with it the dissolution of the September Convention, and Rome became the capital of Italy and seat of government. From 1873 to 1876 Minghetti was prime-minister for the second time, and among many useful measures earned his country's gratitude by effecting the "parraggio" or financial equilibrium between her outlay and income. For the next ten years Minghetti was still the most prominent member of the Italian parliament. His lectures and essays on Raphael and Dante illustrate on the æsthetic side a catholicity of culture which in the sphere of practical politics can point to his treatises on *Economica Publica* (1856), and *La Chiesa e lo Stato* (1878).

MINIÉ, CLAUDE ETIENNE, inventor of the Minié rifle, born in Paris in 1810, died in 1879. He enlisted in the army as a private soldier, and quitted it as Colonel in 1858. He devoted his principal thought to the perfecting of fire-arms, and in 1849 invented the Minié rifle. In 1858 the khedive of Egypt appointed him director of a small-arms factory and musketry school in Cairo.

MINING

MINING. See Britannica, Vol. XVI, pp. 440-472. The product of the world's mining for 1880 was:

Countries.	Value of a Year's Product.				Total.	Number of Miners.	Result per Man
	Gold.	Silver.	Coal.	Sundries.			
Australia.....	\$25,000,000		\$5,000,000	\$10,000,000	\$40,000,000	95,000	\$421.00
Austria.....		\$2,500,000	15,000,000	40,000,000	40,000,000	92,000	430.00
Belgium.....			30,000,000	2,500,000	32,500,000	105,000	310.00
France.....			55,000,000	15,000,000	70,000,000	206,000	350.00
Germany.....		5,000,000	70,000,000	20,000,000	95,000,000	231,000	400.00
Gt. Britain and Ireland.....			335,000,000	60,000,000	395,000,000	538,000	736.00
Italy.....			10,000,000	10,000,000	20,000,000	36,000	260.00
Russia.....	30,000,000		15,000,000	5,000,000	50,000,000	207,000	240.00
Spain.....				30,000,000	30,000,000	70,000	430.00
Spanish America.....	5,000,000	25,000,000	2,500,000	17,500,000	50,000,000	150,000	175.00
Sweden.....				5,000,000	5,000,000	29,000	175.00
United States.....	35,000,000	40,000,000	140,000,000	170,000,000	385,000,000	560,000	687.00
Other countries.....	5,000,000	2,500,000	5,000,000	5,000,000	17,500,000	70,000	250.00
The World.....	\$100,000,000	\$75,000,000	\$680,000,000	\$360,000,000	\$1,215,000,000	2,389,000	\$508.00

These returns of the world's mining are based on Mulhall's tables, and are for 1880.

In the following list we give the mineral products of the United States for 1887 and 1888. (From the latest report of the United States Geological Survey on the Mineral Production of the United States:)*

Products.	1888.		1887.	
	Quantity.	Value.	Quantity.	Value.
METALLIC PRODUCTS.				
Pigiron, spot value..... long tons	6,489,738	\$107,000,000	6,417,148	\$121,925,800
Silver, coining value..... troy ounces	45,723,632	59,195,000	41,269,240	58,441,300
Gold, coining value..... " "	1,624,927	33,175,000	1,596,500	33,100,000
Copper, value at New York City..... lbs.	281,270,622	33,838,354	184,679,524	21,052,440
Lead, value at New York City..... short tons	180,555	15,924,951	160,700	14,483,800
Zinc, value at New York City..... " "	55,903	5,500,855	50,840	4,732,300
Quicksilver, value at San Francisco..... flasks	33,250	1,413,125	33,825	1,429,000
Nickel, value at Philadelphia..... lbs.	207,328	128,382	205,556	133,200
Aluminum, contained in alloys.....	19,000	65,000		74,905
Antimony, value at San Francisco..... short tons	100	20,000	75	15,500
Platinum, value (crude) at New York City..... troy ounces	500	2,000	448	1,838
Total value metallic products.....		\$256,258,267		\$250,419,283
NON-METALLIC (spot values).				
Bituminous coal..... long tons	91,106,998	122,497,341	78,470,857	98,004,656
Pennsylvania anthracite..... " "	41,624,610	89,020,483	37,678,747	84,552,181
Building stone.....		25,500,000		25,000,000
Lime..... barrels	49,087,000	24,548,500	46,750,000	23,375,000
Petroleum..... " "	27,346,013	24,598,559	28,249,597	18,856,626
Natural gas.....		22,662,128		18,838,500
Cement..... barrels	6,253,295	4,533,639	6,992,744	5,186,877
Salt.....	8,055,881	4,377,204	7,831,962	4,093,846
Limestone for iron flux..... long tons	5,438,000	2,719,000	5,377,000	3,226,200
South Carolina phosphate rock..... short tons	433,705	1,961,673	480,558	1,836,818
Mineral waters..... gallons sold	20,000	1,600,000	18,000	1,440,000
Borax..... lbs.	9,628,568	1,709,302	8,259,079	1,261,473
Gypsum.....	7,589,000	455,340	11,000,000	560,000
Manganese ore..... short tons	96,000	430,000	95,000	425,000
Mineral paints..... long tons	25,500	255,000	34,524	333,844
New Jersey Marls..... short tons	24,000	380,000	20,000	310,000
Pyrites..... long tons	60,000	300,000	600,000	300,000
Flint..... lbs.	54,331	167,658	52,500	210,000
Mica.....	30,000	175,000	32,000	185,000
Corundum..... lbs.	48,000	70,000	70,500	142,550
Sulphur..... short tons	589	91,620	600	108,000
Precious stones.....		3,000		100,000
Crude barytes..... long tons		64,850		88,600
Gold quartz, souvenirs, jewelry, etc..... long tons	20,000	110,000	15,000	75,000
Bromine..... lbs.		75,000		75,000
Feldspar..... long tons	307,386	95,290	290,000	61,717
Chrome iron ore..... long tons	8,700	50,000	10,200	55,100
Graphite..... lbs.	1,500	20,000	3,000	40,000
Fluorspar..... short tons	400,000	33,000	416,000	34,000
Slate, ground as pigment..... long tons	2,500	30,000	5,000	20,000
Cobalt oxide..... lbs.	6,000	25,000	2,000	20,000
Novaculite.....	12,306	18,411		18,000
Asphaltum..... short tons	1,500,000	18,000	1,340	18,774
Asbestos.....	53,800	331,500	1,200,000	16,000
Rutile..... lbs.	100	3,000	4,000	4,500
Total value non-metallic mineral products.....		328,914,528		285,864,942
Total value metallic mineral products.....		256,258,267		250,419,283
Estimated value of mineral products unspecified.....		6,000,000		6,000,000
Grand total.....		\$591,172,795		\$542,284,225

* The report of the United States Geological Survey Office, of mineral productions in 1889, had not been completed when this edition was ready for publication.

The following lists are taken from the eleventh census, as published in 1891. The Coal product of the several States was:

States.	1890.		1880.	
	Short Tons.	Value.	Short Tons.	Value.
Alabama.....	8,378,484	\$3,787,436	323,972	\$476,911
Georgia and North Carolina.....	226,156	359,382	154,394	232,006
Illinois.....	12,104,272	11,755,303	6,115,377	8,779,832
Indiana.....	2,845,057	2,887,852	1,454,327	2,150,298
Kentucky.....	2,399,755	2,374,339	940,288	1,134,900
Maryland.....	2,989,715	2,517,474	2,228,917	2,585,537
Michigan.....	67,431	115,011	100,800	224,500
Ohio.....	9,976,787	9,335,400	6,008,595	7,719,667
Pennsylvania anthracite.....	45,544,970	65,718,165	28,640,819	42,172,942
Pennsylvania bituminous coal.....	36,174,069	27,353,215	18,425,163	18,567,129
Tennessee.....	1,925,689	2,338,309	495,131	629,724
Virginia.....	865,786	804,475	45,896	108,092
West Virginia.....	6,231,880	5,086,584	1,829,844	2,013,671

COAL PRODUCT WEST OF THE MISSISSIPPI RIVER IN 1889.

[The figures given are for the short ton of 2,000 pounds.]

Divisions and States.	Number of Miles.		Total product.	Made into coke.	Value of total product at mines.	Average price per ton.
	Regular establishments.	Country Banks and local mines.				
Grand total.....	569	1,326	16,067,500	321,462	\$24,413,262	\$1.52
Trans-Mississippi Valley.....	449	1,234	10,051,229	13,143	14,271,622	1.42
Dakota and Nebraska.....	5	338	30,307	.....	46,281	1.53
Kansas.....	127	295	2,230,763	500	3,294,754	1.48
Indian Territory.....	10	.....	752,832	12,618	1,323,806	1.76
Iowa.....	172	223	4,061,704	25	5,392,220	1.33
Missouri.....	123	356	2,567,823	.....	3,478,058	1.35
Arkansas.....	8	16	279,584	.....	395,886	1.42
Texas.....	4	6	128,216	.....	340,617	2.66
Rocky Mountain Region.....	98	91	4,836,368	306,319	7,486,004	1.55
Montana.....	8	22	363,301	.....	881,523	2.43
Wyoming.....	15	10	1,388,947	30,576	1,748,618	1.26
Colorado.....	53	40	2,360,536	269,526	3,605,622	1.53
New Mexico.....	18	12	486,983	6,000	872,785	1.79
Utah.....	4	7	236,601	.....	377,456	1.60
Pacific Coast.....	22	1	1,179,903	2,217	2,655,636	2.25
California and Oregon.....	10	1	186,179	.....	451,881	2.43
Washington.....	12	.....	993,724	.....	2,203,755	2.22

The total amount of coal produced in the States and Territories west of the Mississippi River aggregated in the calendar year:

	Short tons.
1889.....	16,067,500
1880.....	4,584,324
Increase.....	11,483,176

The value of this product at the mines was as follows:

1889.....	\$24,413,262
1880.....	8,829,722
Increase.....	15,583,540

It is apparent, therefore, that the quantity of coal produced in 1889 has increased to more than threefold during the decade, while the value has decreased from \$1.93 per ton at the mines in 1880 to \$1.52 in 1889.

Four States and Territories are now given as producers of coal, for which no product was reported

in 1880—namely, North Dakota, Texas, New Mexico, and Indian Territory.

The LEAD product of the United States in 1889 was as follows:

SUMMARY OF LEAD PRODUCTION OF ROCKY MOUNTAIN STATES AND TERRITORIES.

States and Territories.	Tons.	Value.
Total.....	130,903	\$4,712,757.27
Arizona.....	3,153	98,747.84
California.....	63	1,999.65
Colorado.....	70,788	2,101,014.31
Idaho.....	23,172	1,042,629.31
Montana.....	10,183	456,976.40
Nevada.....	1,904	72,653.64
New Mexico.....	4,764	170,754.59
South Dakota.....	116	4,553.44
Utah.....	16,675	763,320.09

The total product of the lead and zinc mines of the States east of the Rocky Mountains has been as follows:

TOTAL PRODUCT OF THE LEAD AND ZINC MINES EAST OF THE ROCKY MOUNTAINS.

States.	Total value.	Zinc Ore.		Lead Ore.	
		Short tons.	Value.	Short tons.	Value.
Total.....	\$4,804,179.24	234,503	\$3,049,799.25	50,238	\$1,754,379.99
Arkansas.....	3,650.00	130	3,250.00	20	400.00
Illinois.....	4,800.00			173	4,800.00
Iowa.....	3,600.00	450	3,600.00		
Kansas.....	402,428.47	39,575	299,192.05	3,617	103,236.42
Missouri.....	3,595,218.18	98,131	2,024,057.14	44,432	1,571,161.04
New Mexico.....	2,520.00	140	2,520.00		
Pennsylvania and New Jersey.....	175,052.20	63,339	175,052.20		
Southern States.....	152,280.00	12,906	141,560.00	268	10,720.00
Wisconsin.....	464,630.39	24,832	400,567.86	1,678	64,062.53

TOTAL PRODUCTION OF PRECIOUS STONES, ORNAMENTAL MINERALS, ETC., IN THE UNITED STATES IN 1889.

Names of Gems or Precious Stones.	Value of stones before cutting.	Value of stones after cutting into gems for ornamental purposes.	Value of stones sold as specimens, occasionally polished, but not cut, to certify or show the structure.	Total value.
Total.....	\$107,645	\$81,162	\$188,807	
Sapphire.....	\$2,600	6,725	6,725	
Emerald.....		300	150	450
Aquamarine.....	225	597	150	747
Phenacite.....		200	200	
Topaz.....	100	200	200	400
Turquoise.....	10,000	23,175	500	23,675
Tourmaline.....	1,030	2,250		2,250
Garnet.....	510	1,633	675	2,308
Quartz.....	510	2,750	11,250	14,000
Amethyst.....	15	98		98
Rose Quartz.....	200	400	200	600
Smoky Quartz.....	700	4,007	225	4,232
Gold quartz.....	6,000	9,000		9,000
Rutilated quartz.....	2	80		80
Dumortierite in quartz.....			250	250
Quartz coated with chalcidony.....				
Chrysoprase.....	1,000	2,000	2,000	4,000
Agatized and jasperized wood.....	50	200		200
Banded and moss jasper.....	42,725	53,000	175	53,175
Amazon stone.....		80	550	630
Pyrite.....			500	500
Chlorastrolite.....	100	500	1,500	2,000
Thomsonite.....	200	200	300	500
Fluorite.....	100	200	200	400
Fossil coral.....	100	200	500	700
Azurite and malachite.....	1,000		2,037	2,037
Catlinite (pipestone).....			5,000	5,000
*Zircon.....			16,000	16,000
*Gadolinite, fergusonite, etc.....			1,500	1,500
*Monazite.....			1,000	1,000
*Spodumene.....			200	200
†Wooden ornaments decorated with minerals.....			15,500	15,500
‡Miscellaneous minerals.....			20,000	20,000

*Used to extract the rarer elements for chemical purposes.

†Such as clocks, horseshoes, boxes, etc.

‡For cabinets, museums, etc.

The production of Manganese from 1887 to 1891, inclusive, was as follows:

PRODUCTION OF MANGANESE ORE IN THE UNITED STATES.

States.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	Total.
Virginia.....	23,927	29,198	34,524	30,193	23,258	10,130	6,155	4,532	4,895	5,761	3,661
Arkansas.....	14,616	17,645	19,835	20,567	18,715	8,930	5,855	2,983	3,295	3,661	1,800
Georgia.....	2,368	4,563	9,024	6,041	2,480	800	400	1,000	1,200	1,800	300
Other States.....	1,575	1,672	14	269	450	400	400	875	300		

In the following table will be found a statement of the total production of Petroleum in the United States in 1889, by States:

States.	Barrels. (42 galls.)
Total.....	34,830,306
Pennsylvania and New York.....	21,486,403
Ohio.....	12,471,965
West Virginia.....	358,269
Colorado.....	316,476
California.....	147,027
Kentucky.....	32,758
Illinois.....	5,400
Kansas.....	1,460
Texas.....	500
	48

In this statement the production of Pennsylvania and New York is united. The Bradford (Pennsylvania) and Allegany (New York) fields are regarded as one in petroleum reports. Of the 21,486,403 barrels produced in Pennsylvania and New York in 1889, 7,153,362 barrels were produced in these two districts. The Bradford district lies partly in Pennsylvania and partly in New York. The collection and shipment of its product by pipe lines is such that it is almost impossible to separate the quantity of oil produced in Pennsylvania from that produced in New York.

Since pig-iron is directly made from iron ores, and we have no recent statistics of the amount of iron ore mined in this country, we insert here the results of the Eleventh Census in the pig-iron industry instead.

The production of Pig-Iron during the year ending June 30, 1890, was the largest in the history of the iron industry of this country, amounting to 9,579,779 tons of 2,000 pounds, as compared with 3,781,021 tons produced during the census year 1880 and 2,052,821 tons during the census year 1870. From 1870 to 1880 the increase in production amounted to 1,728,200 tons, or nearly 85 per cent., while from 1880 to 1890 the increase was 5,798,758 tons, or over 153 per cent. The following table shows the production of pig-iron in the various sections of the country in the census years 1870, 1880, and 1890, in tons of 2,000 pounds, including castings made direct from the furnace. The statistics for 1870 and 1880 are for the census years ended May 31, but for 1890 they cover the year ended June 30.

Districts.	Tons of 2,000 Pounds.		
	Year ended May 31, 1870.	Year ended May 31, 1880.	Year ended June 30, 1890.
New England States.....	34,471	30,957	33,751
Middle States.....	1,311,649	2,401,093	5,216,591
Southern States.....	184,540	350,436	1,780,909
Western States.....	522,161	995,335	2,522,351
Far Western States.....		3,200	26,147
Total.....	2,052,821	3,781,021	9,579,779

From the above it will be seen that the pig-iron industry of New England has been practically stationary during the past twenty years, while during the same period, and especially since 1880, there has been a wonderful development of the manufacture of pig-iron in all other sections of the country.

The following table gives the production of pig-iron by States, in tons of 2,000 pounds, including castings made direct from the furnace, during the census years 1880 and 1890, with the number of completed furnace stacks at the close of each year, the relative rank of each State and its percentage of the total production.

Rank	States and Territories.	Year Ended May 31, 1890.		
		Completed furnace stacks.	Production of pig-iron in tons.	Percentage of total production.
1	Pennsylvania...	269	1,930,311	51.05
2	Ohio.....	103	548,712	14.51
3	New York.....	57	313,368	8.29
4	New Jersey.....	20	157,414	4.16
5	Michigan.....	27	119,536	3.16
6	Wisconsin.....	14	118,282	3.13
7	Illinois.....	10	95,468	2.52
8	Missouri.....	17	95,050	2.51
9	West Virginia.....	11	80,050	2.12
10	Alabama.....	15	62,338	1.65
11	Maryland.....	23	59,464	1.58
12	Kentucky.....	22	58,108	1.54
13	Tennessee.....	21	47,873	1.27
14	Georgia.....	10	23,069	
15	Connecticut.....	8	18,779	
16	Indiana.....	4	18,237	
17	Virginia.....	31	17,906	
18	Massachusetts.....	6	9,548	2.51
19	Oregon.....	1	3,200	
20	Maine.....	1	2,015	
21	Texas.....	1	1,400	
22	Vermont.....	1	620	
23	Minnesota.....	1		
24	North Carolina.....	7		
25	Utah.....	2		
	Total.....	681	3,781,021	100.00

Rank	States.	Year Ended June 30, 1890.		
		Completed furnace stacks.	Production of pig-iron in tons.	Percentage of total production.
1	Pennsylvania...	224	4,719,511	49.19
2	Ohio.....	71	1,502,299	13.59
3	Alabama.....	48	890,432	9.29
4	Illinois.....	15	674,506	7.04
5	New York.....	37	359,040	3.75
6	Virginia.....	31	302,447	3.16
7	Tennessee.....	19	290,747	3.04
8	Michigan.....	26	224,308	2.35
9	Wisconsin.....	10	210,037	2.19
10	New Jersey.....	18	145,040	1.51
11	West Virginia.....	5	108,764	1.14
12	Missouri.....	8	99,131	1.04
13	Maryland.....	14	96,246	1.00
14	Kentucky.....	6	44,199	
15	Georgia.....	5	35,747	
16	Connecticut.....	8	21,700	
17	Colorado.....	2	12,949	
18	Indiana.....	2	11,470	
19	Texas.....	4	8,950	171
20	Oregon.....	1	3,411	
21	Massachusetts.....	4	8,331	
22	Washington.....	1	4,787	
23	Maine.....	1	3,700	
24	North Carolina.....	1	3,377	
25	Minnesota.....	1		
	Total.....	562	9,579,779	100.00

QUICKSILVER MINING IN THE UNITED STATES.—During the calendar year 1889 there were 26,464 flasks, or 2,024,496 pounds, or 1,012 short tons of quicksilver produced in California. About 20 flasks were produced in Oregon. The product is notably less than the usual yield. In 1888, 33,250 flasks were produced.

THE WORLD'S PRODUCTION OF QUICKSILVER FOR
TEN YEARS.

Year.	Total of all mines, United States.	Almaden mine, Spain.	Idria mine, Austria.	Italian mines.	Total Foreign mines.	Grand total, yearly.
	Flasks.	Flasks.	Flasks.	Flasks.	Flasks.	Flasks.
1880.....	59,926	45,322	10,510	3,410	59,243	119,168
1881.....	60,851	44,989	11,333	3,760	60,083	120,933
1882.....	52,732	46,716	11,663	4,110	63,439	115,221
1883.....	31,913	49,707	13,152	6,065	68,394	115,119
1884.....	31,913	45,813	13,563	6,889	69,915	101,238
1885.....	32,073	45,813	13,563	6,889	69,915	101,238
1886.....	29,981	51,199	14,496	7,375	73,070	103,051
1887.....	33,760	53.2	14,676	7,075	75,027	108,787
1888.....	33,250	51,872	14,962	9,830	76,664	109,914
1889.....	26,464	49,477	15,285	10,000	74,773	101,236
Total.....	407,675	435,939	133,557	66,440	635,936	1,093,611

The production of cut mica in the United States in the census year amounted to 49,500 pounds, valued at \$50,000. In addition to this, 196 short tons of scrap or waste mica were sold for grinding purposes, with a value of \$2,450. The production in 1880, as given in the Tenth Census report, was 81,669 pounds of cut mica, valued at \$127,825.

A review of the annual production during the past nine years shows that the industry advanced in importance until 1885. Since then the tendency has been downward, though the fluctuations in the production of the different regions have caused much irregularity in the annual totals. The following table does not include statistics of scrap and waste mica, as there had been no attempt prior to 1889 to determine the amount of this waste which has been utilized:

CUT MICA PRODUCED IN THE UNITED STATES.

Years.	Amount (Pounds).	Value.
1880.....	81,669	\$127,825
1881.....	100,000	250,000
1882.....	100,000	250,000
1883.....	114,000	285,000
1884.....	147,410	368,525
1885.....	92,000	161,000
1886.....	40,000	70,000
1887.....	70,000	142,250
1888.....	48,000	70,000
1889.....	49,500	50,000

During the years 1883 and 1884, when mica mining was in its most flourishing condition, the manufacturers of stoves consumed probably 95 per cent. of the product, and the fancy grades and large sizes of sheet mica which were then used found a ready sale at highly profitable prices. Under this stimulus of large profits many surface deposits or pockets were opened by farmers, who worked them occasionally when other business was dull and realized a considerable profit on their production. As long as the demand for large sizes continued, this intermittent sort of mining could be carried on with success, but when the fashion in stove panels changed, and small sheets were used in place of large ones, the demand for the latter fell off to a great extent.

PRODUCTION AND VALUE OF MICA IN THE UNITED
STATES IN 1889.

Distribution.	Cut.		Scrap.	
	Pounds. 49,500	Value. \$50,000	Short tons. 196	Value. \$2,450
Total.....				
New Hampshire.....	40,000	40,000	160	2,000
North Carolina.....	6,7000	7,000		
Virginia and South Dakota.....	2,800	3,000	36	450

SLATE MINING IN THE UNITED STATES.—The total value of all slate produced in the United States in 1889, as shown by the following table, is \$3,444,863. Of this amount, \$2,775,271 is the value of 828,990 squares of roofing slate, and \$669,592 is the value of slate for all other purposes besides roofing.

As compared with the statements of the tenth census report of 1880, the roofing slate product of 1889 is nearly twice as great in number of squares and in value. A consideration of the slate used for purposes other than roofing appears to have been omitted from the Tenth Census report. The total value of all slate produced in 1889 is more than twice as great as that considered in the Tenth Census.

According to "Mineral Resources of the United States, 1889," the total number of squares of roofing slate produced in that year is 662,400, valued at \$2,053,440.

DISTRIBUTION OF THE QUARRIES.—Twelve States at present produce slate. A line drawn on to the map from Piscataquis county, Maine, Polk county, Georgia, and approximately following the coast outline, passes through all the important slate-producing localities. According

to amount and value of product, the most important States are, in the order named, Pennsylvania, Vermont, Maine, New York, Maryland, and Virginia. In the remaining six States productive operations are of limited extent, and in the case of Arkansas, California, and Utah, of very recent date.

COPPER MINING IN THE UNITED STATES.—Since the census year 1880 the United States has risen to the rank of the largest copper producer in the world, outstripping by far any other country. During the decade Arizona and, later, Montana have become important producing States, the latter now acquiring and maintaining its rank as the

PRODUCTION OF SLATE IN THE UNITED STATES FOR THE YEAR 1889.

States.	Number of quarries.	Number of squares of roofing slate.	Total value of roofing slate.	Total value of slate for other purposes.	Total value of all slate produced.
Arkansas.....	1	60	\$240	(a)	\$240
California.....	2	2,504	13,889	(a)	13,889
Georgia.....	4	3,050	14,850	\$480	15,330
Maine.....	4	43,500	214,000	(a)	214,000
Maryland.....	5	23,100	105,745	4,263	110,008
Michigan.....	1	3,000	15,000	(a)	15,000
New Jersey.....	5	2,700	10,800	125	10,925
New York.....	16	17,167	85,726	44,877	130,603
Pennsylvania.....	104	474,602	1,686,945	\$74,831	2,011,776
Utah.....	1	(a)	(a)	(a)	(a)
Vermont.....	60	235,585	592,997	245,016	838,013
Virginia.....	3	23,457	85,079	(a)	85,079
Total.....	206	838,990	\$2,775,271	\$669,592	\$3,444,863

(a) None.

COPPER PRODUCTION IN 1889.

States and Territories.	Ore produced (Short tons).	Mineral (Pounds).	Black copper (Pounds).	Matte. Pounds.	Fine copper contents (Pounds).
Total.....	3,922,742	117,804,926	39,713,237	159,547,390	220,569,438
Michigan.....	2,433,733	117,804,926			87,455,675
Montana.....	698,837		10,176,744	147,800,590	97,388,064
Arizona.....	155,586		29,532,493	4,126,000	31,583,685
New Mexico.....	34,586		4,000	7,620,800	3,883,014

leader. While by far the greater part of the metal produced is obtained from ores carrying only the baser metal, important quantities in the aggregate are derived from ores in which lead, gold and silver are the principal constituents of value. These quantities are difficult to trace to their source. The ores are purchased by lead and copper smelters in the open market, often in small parcels, indirectly, through sampling works. Sometimes copper is not even present in the original ore in marketable quantity, and becomes a factor only when it appears in a concentrated form in the mattes of lead smelters and refiners.

The copper product of the United States was as follows, in pounds, in the calendar year 1889:

	Pounds.
Arizona.....	31,589,185
Michigan.....	87,455,075
Montana.....	98,222,444
New Mexico.....	3,686,137
Colorado.....	1,170,053
Idaho.....	150,490
Nevada.....	29,420
Utah.....	65,467
California.....	151,505
Wyoming.....	100,000
Vermont.....	72,000
Southern States.....	18,144
Lead smelters and refiners.....	3,945,442
Total.....	226,055,962

These figures include the quantities of copper reported as an incidental constituent of other ores.

The details of the copper mining of the principal producing States during the year 1889 are given in the following table, but does not include those mines fairly to be considered as precious-metal mines:

GOLD AND SILVER PRODUCED IN THE UNITED STATES.—The following estimate of the gold and silver produced in the United States, since the discovery of gold in California, is compiled from the official reports of the director of the United States mint:

Year.	Gold.	Silver.	Total.
1849	\$40,000,000	\$50,000	\$40,050,000
1850	50,000,000	50,000	50,050,000
1851	55,000,000	50,000	55,050,000
1852	60,000,000	50,000	60,050,000
1853	65,000,000	50,000	65,050,000
1854	60,000,000	50,000	60,050,000
1855	55,000,000	50,000	55,050,000
1856	55,000,000	50,000	55,050,000
1857	55,000,000	50,000	55,050,000
1858	50,000,000	500,000	50,500,000
1859	50,000,000	100,000	50,100,000
1860	46,000,000	150,000	46,150,000
1861	48,000,000	2,000,000	45,000,000
1862	39,200,000	4,500,000	43,700,000
1863	40,000,000	8,500,000	48,500,000
1864	46,100,000	11,000,000	57,100,000

Year.	Gold.	Silver.	Total.
1865	53,225,000	11,250,000	64,475,000
1866	53,500,000	10,000,000	63,500,000
1867	51,725,000	13,500,000	65,225,000
1868	48,000,000	12,000,000	60,000,000
1869	49,500,000	12,000,000	61,500,000
1870	50,000,000	16,000,000	66,000,000
1871	43,500,000	23,000,000	66,500,000
1872	36,000,000	28,750,000	64,750,000
1873	36,000,000	28,750,000	64,750,000
1874	38,490,902	37,324,594	70,815,496
1875	33,467,856	31,727,560	65,195,416
1876	39,929,166	38,783,016	78,712,182
1877	46,897,390	39,793,573	86,690,963
1878	51,205,360	45,281,385	96,487,745
1879	38,899,858	40,812,132	79,711,990
1880	36,000,000	38,450,000	74,450,000
1881	34,700,000	43,000,000	77,700,000
1882	32,500,000	46,800,000	79,300,000
1883	30,000,000	46,200,000	76,200,000
1884	30,500,000	48,800,000	79,300,000
1885	30,500,000	51,000,000	81,500,000
1886	35,000,000	51,000,000	86,000,000
1887	33,000,000	53,357,000	86,357,000
1888	33,175,000	59,195,000	92,370,000
1889	32,800,000	64,646,000	97,446,000

The total value of the precious metals exported from Alaska up to the present time approaches \$4,000,000, the annual production of gold dust and bullion being now \$700,000. Within a radius of 100 miles from Juneau quartz mills have been established, with an aggregate capacity of 500 stamps. Of these, 240 stamps are employed at the well-known Treadwell or Paris mine, on Douglas island, capable of reducing 600 tons of ore per diem when both steam and water power are utilized.

MINNEAPOLIS, a city of Minnesota, the metropolis of the State, built on a broad plain overlooking the Mississippi River and St. Anthony Falls, the scenery being very picturesque. The celebrated Minnehaha Falls are situated between Minneapolis and St. Paul. Several important railroad lines have their junctions at Minneapolis. This place has some extensive grain elevators, large flour-mills, and works for the manufacture of iron-machinery, engines, boilers, farm implements, furniture, carriages, etc. Population in 1891, 164,738. See Britannica, Vol. XVI, pp. 474-475.

MINNEAPOLIS, a city, the county-seat of Ottawa county, Kan., on Solomon River. It contains saw and grist-mills, a carriage factory, a machine shop, and foundry.

MINNEHAHA, a beautiful waterfall near Minneapolis, Minn. The Minnehaha River falls 60 feet down a limestone precipice. The legend of a love-lorn Indian girl leaping over the fall has been utilized by Longfellow in his poem Minnehaha.

MINONK, a city of Woodford county, Ill., 118 miles southwest of Chicago. Mining and agriculture are the principal occupations, and the city has a steam mill, eight elevators, and coal mines.

MINOT, GEORGE RICHARDS (1758-1802), an American jurist. He began the practice of law in Boston, Mass., and in 1771 became clerk of the Massachusetts house of representatives. In 1792 he was made probate judge for the county of Suffolk, in 1799 chief justice of the court of common pleas, and in 1800 judge of the municipal court of Boston. Judge Minot published *History of the Insurrection in Massachusetts in 1786* (1786), and *Continuation of the (Hutchinson's) History of Massachusetts Bay From the year 1743, with an Introductory Sketch of Events from its Original Settlement* (1798).

MINT, the common name of a number of fragrant labiate plants. See Britannica, Vol. XVI, p. 491; Vol. XII, p. 289; Vol. XVIII, p. 517.

MINT, UNITED STATES. For general article or MINTS AND COINAGE, see Britannica, Vol. XVI, pp. 480-91. In the United States there are five mints—at Philadelphia (since 1793), New Orleans (1835), San Francisco (1854), Carson City, and Denver—all under the charge of the Bureau of the Mint of the United States Treasury Department, and presided over by the Director of the Mint. Only the first three are in active operation, the other two are really assay offices; and at Philadelphia alone all the authorized coins are struck. The United States coins and their weights are as follows, those marked with an asterisk having been discontinued:

Denomination	Weight in Grains	Denomination	Weight in Grains
Gold.		20-cent*	77.16
Double eagle.....	516	Dime.....	38.53
Eagle.....	258	Half-dime*	19.2
Half-eagle.....	129	8-cent*	11.51
Quarter-eagle.....	64.5	Minor Coins.	
3-dollar piece.....	77.4	5-cent (nickel).....	77.16
Dollar.....	25.8	3-cent (nickel).....	30
Silver.		2-cent (bronze)*.....	96
Dollar.....	412.5	Cent (copper)*.....	168
Trade-dollar*.....	420	Cent (nickel)*.....	73
Half-dollar.....	192.9	Cent (bronze).....	48
Quarter-dollar.....	96.45	Half-cent (copper)*.....	84

The following table shows the total coinage of the United States from the beginning up to and including 1885, and also for each subsequent year to and including the fiscal year closing June 30, 1890:

	Gold.	Silver.	Minor Coin.
To 1885	\$1,389,981,508	\$434,224,610	\$17,463,608
1886	28,945,542	32,086,709	344,186
1887	23,972,383	35,191,081	1,215,686
1888	28,346,170	34,136,095	1,218,977
1889	25,543,910	34,515,546	906,478
1890	22,021,748	36,815,837	1,416,352
Total	\$1,518,829,361	\$606,969,878	\$22,564,782

MINUIT, or MINNEWIT, PETER (1580-1641), a Dutch colonist. He was born in Wesel, Rhenish Prussia, and for a time was deacon in the Walroon church in his native town. He then removed to Holland, and in 1625 was appointed by the Dutch West India Company its director in New Netherlands, and was the first governor of the island. He returned to Europe in 1632, and in 1637 set sail from Gothenberg with a body of Swedish and Finnish colonists. He ascended the Delaware River, and planted his colony near the present city of Wilmington.

MINUTE MEN, in the American Revolution, the militia who were prepared for service at a minute's notice.

MIRACLES. See Britannica, Vol. II, pp. 188, 191; Vol. X, pp. 804, 809; Vol. VIII, p. 141; Vol. I, 127; Vol. IV, p. 754; Vol. XXIV, p. 664.

MIRAJ, a native state of India in the southern Mahratta country. Population, 69,732. The capital, Miraj, near the Kistna River, has a population of 20,616.

MIRAMAR, a palace standing on the rocky shore of the Adriatic near Grignano, six miles north-west of Trieste, the home of the Archduke Maximilian, afterwards Emperor of Mexico.

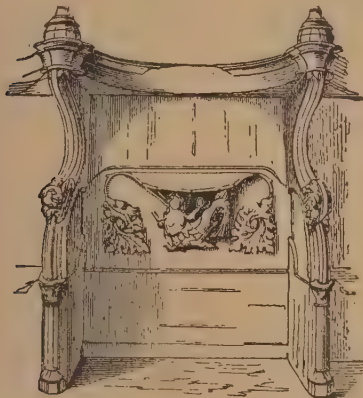
MIRANDOLA, a town of northern Italy, nineteen miles by rail northeast of Modena. It has a fine cathedral and an old castle. Population 3,059.

MIRECOURT, a town in the department of Vosges, 236 miles southeast of Paris with manufactures of lace and musical instruments. Population 5,341.

MIRFIELD, a manufacturing town in the West Riding of Yorkshire, three miles from Dewsbury, and four and a half from Huddersfield. It has a townhall, a parish church, and manufactories of woolen cloths, carpets, blankets, etc. Population 11,508.

MISERERE, the name by which, in Catholic usage, the Fiftieth Psalm of the Vulgate (51st in Authorized Version) is commonly known. It is one of the so-called "Penitential Psalms," which are said after Lauds on the Fridays in Lent, except Good Friday. It has been commonly understood to have been composed by David in the depth of his remorse for the double crime which the prophet Nathan rebuked in the well-known parable (2 Sam. xii). For an account of the celebrated *Miserere* of Allegri, performed annually in the Sistine chapel, see *Britannica*, Vol. I, p. 581.

MISERERE, a small movable seat attached to each of the stall-seats of the choir of mediæval



churches and chapels, etc. It is usually ornamented with carved work, and is so shaped that when the seat-proper is folded up it forms a small seat at a higher level, sufficient to afford some support to a person resting upon it. Aged and infirm ecclesiastics were allowed to use these seats during long services.

MISHAWAKA, a post-village and a railroad junction of St. Joseph county, Ind., four miles east of South Bend. Wagons, carriages, farm-tools, windmills, furniture, brushes, woolen goods and flour are made here. Population 3,369.

MISIONES, an Argentine territory, lies between the Uruguay and the Paraná, and is bounded on all sides but the southwest by Brazil and Paraguay. Area, 20,823 square miles; population, 30,000—though before the expulsion of the Jesuits (1767) it exceeded 100,000. There are three low mountain-chains radiating from the center. The greater portion of the surface is covered with forest, producing building and dye-woods, oranges, medicinal herbs, and the *yerba maté*. Maize is largely grown, and sugar-cane to some extent; of late years several sugar-houses have been erected. Capital, Posadas.

MISSISSIPPI, STATE OF. For general article on MISSISSIPPI, see *Britannica*, Vol. XVI, pp. 518-524. The United States census of 1890 reports the area as 46,810 square miles, including 470 square miles of water surface. Population, 1,289,600, an increase of 158,003 during the decade. Capital, Jackson, with a population of 6,041.

The land areas in square miles and the populations of the several counties of the State in 1890 were as follows:

Counties.	Areas.	Pop. 1890.	Pop. 1880.
Adams	400	26,031	22,649
Alcorn	480	13,115	14,272
Amite	700	18,198	14,004
Attala	750	22,213	19,988
Benton	436	10,585	11,023
Bolivar	876	29,980	18,652
Calhoun	600	14,688	13,492
Carroll	615	18,773	17,795
Chickasaw	520	19,891	17,905
Choctaw	406	10,847	9,036
Claiborne	452	14,516	16,768
Clarke	660	15,826	15,021
Clay	420	18,607	17,367
Coahoma	500	18,342	15,568
Copiah	760	30,233	27,552
Covington	570	8,299	5,993
De Soto	480	24,183	22,994
Franklin	556	10,424	9,729
Greene	820	3,906	3,194
Grenada	430	14,974	12,071
Hancock	549	8,318	6,489
Harrison	990	12,481	7,896
Hinds	870	39,279	43,958
Holmes	750	30,970	27,164
Issaquena	370	12,318	10,004
Itawamba	540	11,708	10,663
Jackson	1,072	11,251	7,607
Jasper	720	14,785	12,126
Jefferson	490	18,947	17,814
Jones	680	8,333	8,828
Kemper	740	17,961	15,719
Lafayette	720	20,553	21,671
Lauderdale	680	29,661	21,501
Lawrence	690	12,318	9,420
Leake	560	14,803	13,146
Lee	470	20,040	20,470
Leflore	660	16,569	10,236
Lincoln	570	17,919	13,547
Lowndes	536	27,047	23,244
Madison	720	27,321	25,866
Marion	1,055	9,532	6,901
Marshall	720	26,042	29,330
Monroe	770	30,730	28,533
Montgomery	835	14,459	18,348
Neshoba	660	11,146	8,741
Newton	576	16,625	13,436
Noxubee	608	27,338	29,874
Oktibbeha	460	17,694	15,973
Panola	680	26,977	28,332
Pearl River	666	2,557	.....
Perry	1,116	6,494	8,427
Pike	720	21,203	16,688
Pontotoc	430	14,940	13,638
Prentiss	415	13,679	12,158
Quitman	400	3,286	1,407
Rankin	755	17,922	16,752
Scott	610	11,740	10,445
Sharkey	425	9,332	6,306
Simpson	580	10,138	8,908
Smith	630	10,635	8,088
Sumner .....	.....	.....	9,534
Sunflower	720	9,884	4,661
Tallahatchie	655	14,361	10,925
Tate	390	19,353	18,721
Tippah	490	12,957	12,867
Tishomingo	435	9,302	8,774
Tunica	460	12,158	8,461
Union	424	16,606	13,030
Warren	590	33,164	31,238
Washington	880	40,414	25,367
Wayne	775	9,817	8,741
Webster	430	12,060	.....
Wilkinson	592	17,592	17,815
Winston	640	12,080	10,067
Yalobusha	473	16,629	15,649
Yazoo	1,020	36,394	33,845

The full list of governors of the State of Mississippi, including the dates of their terms of service, is as follows:

TERRITORIAL.

Winthrop Sargent.....1798-1802 | Robert Williams.....1805-9
Wm. C. C. Claibourne.....1802-5 | David Holmes.....1809-17

STATE.

David Holmes.....1817-19 | James Whitfield.....1851-52
George Poindexter.....1819-21 | Henry S. Foote.....1852-54
Walter Leake.....1821-25 | John J. McKee.....1854-58
David Holmes.....1825-27 | William McWillie.....1858-60
Gerhard C. Brandon.....1827-31 | John J. Pettus.....1860-62
Abraham M. Scott.....1831-33 | Jacob Thompson.....1862-64
Hiram G. Bunnels.....1833-35 | Charles Clarke.....1864-65
Charles Lynch.....1835-37 | William L. Sharkey.....1865-66
Alexander G. McNutt.....1837-41 | Benj. G. Humphreys.....1866-70
Tilghman M. Tucker.....1841-43 | James L. Alcorn.....1870-71
Albert G. Brown.....1843-48 | Ridgely C. Powers.....1871-74
Joseph W. Matthews.....1848-50 | Adelbert Ames.....1874-78
John A. Quitman.....1850-51 | John M. Stone.....1878-82
John J. Guion.....1851 | Robert Lowry.....1882-90
John M. Stone, 1890-94.

The governor's salary is \$4,000.

The population of the chief cities and towns are as follows: Vicksburg, 13,298; Meridian, 10,889; Natchez, 10,101; Greenville, 6,655; Yazoo City, 5,247; Columbus, 4,552; Aberdeen, 3,445; Water Valley, 2,828.

ABBREVIATED HISTORIC OUTLINE.—The Territory of Mississippi was first visited by white men (it is believed) in 1539. In the spring of 1541 Fernando de Soto, the first visitor, who had spent about a year on the Yazoo Bottoms, reached the Mississippi River. Over a century later (1673), Joliet and Marquette, two French explorers, passed down the Mississippi, touching at several points in the territory. In 1682 De la Salle and de Tonti visited the Natchez Indians. The first colony proper was established by Iberville, with 200 French immigrants, on the eastern shore of Biloxi Bay. A French colony and a fortress were established at Natchez about 1716 and named Rosalia, in honor of the Countess of Pontchartrain. Rosalia Fortress was assaulted and captured by the Indians in 1729, but was retaken in 1830. In 1763 Eastern Louisiana, including most of the present State of Mississippi, was ceded by France to Great Britain, and in 1783 the whole passed into the possession of the United States under treaty stipulations. The territorial government was organized in 1798. In March, 1817, Alabama was set off from the Mississippi Territory, and in December, 1817, Mississippi was admitted into the Union as a State.

Progress of population of Mississippi by decades: 1800, 8,850; 1810, 40,352; 1820, 75,448; 1830, 136,621; 1840, 375,651; 1850, 605,948; 1860, 791,631; 1870, 827,922; 1880, 1,131,597; 1890, 1,289,600.

For numerous additional items relating to Mississippi, see the article UNITED STATES, in these Revisions and Additions.

MISSOURI, STATE OF. For general article on Missouri, see Britannica, Vol. XVI, pp. 524-27. The United States census of 1890, reports the area as 69,415 square miles, including 680 square miles of water surface. Population, 2,679,184, an increase of 510,804 during the decade. Capital, Jefferson City, with a population of 6,732. The population of other chief cities and towns was as follows: St. Louis, 450,245; Kansas City, 132,416; St. Joseph, 52,811; Springfield, 21,842; Sedalia, 13,994; Hannibal, 12,816; Joplin, 9,909; Moberly, 8,213; Carthage, 7,962; Independence, 6,373; Chillicothe, 5,699; Louisiana, 5,071; Trenton, 5,011; Mexico, 4,789; Clinton, 4,689; Warrensburg, 4,682; Lexington, 4,538; Brookfield, 4,534; Fulton, 4,289; Cape Girardeau, 4,238; Mar-

shall, 4,258; Booneville, 4,132; Maryville, 4,017; Columbia, 3,985; Carrollton, 3,858; Kirksville, 3,491; Macon City, 3,350; Cameron, 2,895; Butler, 2,812; Holden, 2,515.

The land area in square miles, and the populations of the several counties in the State of Missouri in 1890, were as follows:

Counties.	Areas.	Pop. 1890.	Pop. 1880.
Adair.....	570	17,470	15,190
Andrew.....	420	16,000	16,318
Atchison.....	560	15,533	14,556
Audrian.....	680	22,074	19,782
Barry.....	810	22,943	14,495
Barton.....	612	18,504	10,332
Bates.....	874	32,223	25,381
Benton.....	744	14,973	12,396
Bollinger.....	616	13,721	11,130
Boone.....	680	26,043	25,422
Buchanan.....	420	70,100	49,792
Butler.....	716	9,964	6,011
Caldwell.....	490	15,152	13,646
Callaway.....	700	25,131	23,670
Camden.....	692	10,040	7,266
Cape Girardeau.....	540	22,060	20,998
Carroll.....	690	25,742	23,274
Cass.....	500	5,799	2,168
Cedar.....	496	23,301	22,431
Chariton.....	740	15,620	10,741
Christian.....	740	26,254	25,224
Clark.....	566	14,017	9,628
Clark.....	510	15,126	15,031
Clay.....	415	19,856	15,572
Clinton.....	440	17,138	16,073
Cole.....	390	17,281	15,515
Cooper.....	562	22,707	21,596
Crawford.....	710	11,961	10,756
Dade.....	500	17,525	12,557
Dallas.....	530	12,647	9,263
Davies.....	576	20,456	19,145
DeKalb.....	720	14,539	13,334
Dent.....	720	12,149	10,646
Douglas.....	792	14,111	7,753
Dunklin.....	500	15,085	9,604
Franklin.....	866	28,056	26,584
Gasconade.....	510	11,706	11,153
Gentry.....	450	19,018	17,176
Greene.....	688	48,616	28,801
Grundy.....	460	17,876	15,185
Harrison.....	730	21,033	20,304
Henry.....	740	28,235	23,906
Hickory.....	415	9,453	7,887
Holt.....	462	15,469	15,509
Howard.....	450	17,371	18,428
Howell.....	920	18,618	8,814
Iron.....	550	9,119	8,183
Jackson.....	630	160,510	82,325
Jasper.....	672	50,500	32,019
Jefferson.....	640	22,484	18,736
Johnson.....	800	28,132	28,172
Knox.....	510	13,501	13,047
Laclede.....	740	14,701	11,334
Lafayette.....	632	30,184	25,710
Lawrence.....	606	26,228	17,563
Lewis.....	510	15,935	15,925
Lincoln.....	598	18,346	17,426
Linn.....	620	24,121	20,016
Livingston.....	520	20,668	10,196
McDonald.....	580	11,283	7,816
Macon.....	820	30,515	26,222
Madison.....	492	9,268	8,876
Maries.....	515	8,600	7,304
Marion.....	420	26,293	24,837
Mercer.....	484	14,581	14,673
Miller.....	590	14,162	9,805
Mississippi.....	430	10,134	9,370
Moniteau.....	420	15,630	14,346
Monroe.....	644	20,790	19,071
Montgomery.....	546	16,500	16,249

Counties.	Areas.	Pop. 1890.	Pop. 1880.
Morgan	638	12,311	10,132
New Madrid.....	620	9,317	7,694
Newton.....	648	22,108	18,947
Nodaway.....	648	30,014	29,544
Oregon.....	480	10,337	5,791
Osage.....	586	13,080	11,824
Ozark.....	780	9,795	5,618
Pemiscot.....	480	5,975	4,299
Perry.....	436	13,237	11,895
Pettis.....	668	31,151	27,271
Phelps.....	640	12,623	12,568
Pike.....	620	26,321	25,715
Platte.....	410	16,248	17,366
Polk.....	640	20,339	15,734
Pulaski.....	520	9,837	7,250
Putnam.....	542	15,365	13,555
Ralls.....	490	12,394	11,838
Randolph.....	470	24,892	22,751
Ray.....	584	24,315	20,190
Reynolds.....	830	6,633	5,722
Ripley.....	640	8,332	5,377
Saint Charles.....	520	22,977	23,005
Saint Clair.....	690	16,747	14,125
Sainte Genevieve.....	460	9,883	10,390
Saint Francis.....	410	17,347	13,822
Saint Louis.....	492	36,307	31,883
Saint Louis city.....	48	451,770	350,518
Saline.....	760	33,762	29,911
Schuyler.....	336	11,249	10,470
Scotland.....	440	12,674	12,508
Scott.....	434	11,228	8,587
Shannon.....	960	8,718	3,441
Shelby.....	514	15,642	14,024
Stoddard.....	840	17,337	13,441
Stone.....	516	7,090	4,404
Sullivan.....	656	19,000	16,565
Taney.....	660	7,973	5,599
Texas.....	1,145	19,406	12,206
Vernon.....	850	31,505	19,369
Warren.....	436	9,913	10,805
Washington.....	780	13,153	12,896
Wayne.....	800	11,727	9,096
Webster.....	630	15,177	12,175
Worth.....	270	8,738	8,203
Wright.....	700	14,484	9,712

The full list of governors of the State, with their date of service, is shown in the subjoined table:

Alexander McNair.....1820-24	Claiborne F. Jackson.....1861
Frederick Bates.....1824-26	Hamilton R. Gamble.....1861-64
John Miller.....1826-32	Thomas C. Fletcher.....1865-69
Daniel Dunklin.....1832-36	Joseph W. McClurg.....1869-71
Liburn N. Boggs.....1836-40	Benj. Gratz Brown.....1871-73
Thomas Reynolds.....1840-44	Silas Woodson.....1873-75
John C. Edwards.....1844-48	Charles H. Hardin.....1875-77
Austin A. King.....1848-53	John S. Phelps.....1877-81
Starling Price.....1853-57	Thomas T. Crittenden.....1881-85
Trustin Polk.....1857	John S. Marmaduke.....1885-187
Hancock Johnson.....1857	Albert T. Morehouse.....1887-89
B. M. Stewart.....1857-61	David R. Francis.....1889-93

Governor Francis' term expires Jan. 10, 1893. The governor's salary is \$5,000.

ABBREVIATED HISTORIC RECORD OF MISSOURI.—Territory first explored by De Soto, in 1541-42; visited by Marquette and followers in 1673. It formed part of "Louisiana Purchase," a portion of which was organized as the District of Louisiana in 1805. The territory took the name of Missouri in 1812. In 1821 Missouri was admitted into the Union the "Missouri Compromise," by which compact it was provided that slavery should be forever excluded "from all that part of Louisiana north of 36° 30' latitude, except Missouri."

Progress of population of Missouri by decades: 1810, 20,845; 1820, 66,557; 1830, 140,455; 1840, 383,702; 1850, 682,044; 1860, 1,182,012; 1870, 1,721,295; 1880, 2,168,380; 1890, 2,679,184.

For numerous additional items relating to Missouri, see the article UNITED STATES in these Revisions and Additions.

MISSOURI VALLEY, a post-village and a railroad junction of Harrison county, Iowa, situated twenty-one miles north of Council Bluffs, on Willow River.

MISTASSINI, LAKE, in Labrador, some 300 miles north of Quebec, is strictly speaking an expansion of the River Rupert, which flows into the southern extremity of Hudson Bay. It is 100 miles long from northeast to southwest by twelve in average breadth.

MISTRAL, FREDERICK, a Provençal poet, born a peasant's son near Maillaune, Sept. 8, 1830, and studied law at Avignon; but for law he had no liking, and went home to work on the land and to write poetry. In 1859 he published the epic *Mirio*, written in his native Provençal dialect. This charming representation of life in southern France made Mistral's name famous throughout the country, and gained for him the poet's prize of the French Academy and the cross of the Legion of Honor. It also led to the formation of the society called Lou Felibrige, which set itself to create a modern Provençal literature. In 1867 Mistral published a second epic, *Calendau*, and in 1876 a volume of poems entitled *Lis Iselo d'Or*, songs steeped in the golden sunshine of the Mediterranean and its vine-clad shores. Since then he has written a novel, *Nerto*, and issued a dictionary of the Provençal dialect, the preparation of which occupied him many years.

MISTRETTA, a town of Sicily, near the north coast, half-way between Palermo and Messina. Population, 12,235.

MITCHEL, JOHN (1815-1875), an Irish patriot. He practiced law for several years in Banbridge, and then for a time was editor of the Dublin "Nation." In 1847 he founded the "United Irishman," and the following year was arrested for treason. He was sentenced to fourteen years of banishment, and sent to Tasmania, but escaped to New York in 1853. There he started the "Citizen," and advocated slavery, and later established the "Irish Citizen." Subsequently he returned to Ireland, and was elected to Parliament in 1874, but was declared ineligible. The following year he was again returned, but died before any action was taken in his case. He published *Life of Hugh O'Neill, Prince of Ulster* (1845); *The Last Conquest of Ireland* (Perhaps) (1861); *History of Ireland from the Treaty of Limerick* (1868), and *Life and Times of Aodh O'Neill, Prince of Ulster* (1868).

MITCHELL, a manufacturing town of Perth Co., Ontario, thirty-two miles southeast of Goderich.

MITCHELL, a railroad junction and county-seat of Davison county, S. Dak. It is the seat of a Methodist University.

MITCHELL, a post-village and a railroad junction of Lawrence county, Ind., situated 62 miles northwest of New Albany.

MITCHELL, DONALD GRANT, an American author, born in 1822. From 1841 to 1844 he worked on a farm for the benefit of his health, and then spent two years in Europe for the same purpose. From that time his life has been given almost entirely to literature. He has published *Fresh Gleanings, or a New Sheaf from the Old Field of Continental Europe* (1847); *The Battle Summer* (1850); *The Reveries of a Bachelor* (1851); *Dream Life* (1852); *My Farm at Edgewood* (1863); *Wet Days at Edgewood* (1864); *Doctor John* (1866); *Rural Studies, with Notes for Country Places* (1867); and *About Old Storytellers* (1875). Many of his books have been written under the pen-name of "Ike Marvel."

MITCHELL, JOHN KEARSLEY (1798-1858), an American physician. From 1819 to 1822 he was a ship-surgeon, and then settled in Philadelphia. In 1824 he became lecturer on the institutes of medicine and physiology at the Philadelphia Medical Institute, and in 1826 was made professor of chemistry. From 1833 to 1841 he held a similar position in Franklin Institute, and then was chosen professor of the theory and practice of medicine in Jefferson Medical College, in which capacity he served until his death. He was the author of *Saint Helena*, a poem, (1821); *Indecision, a Tale of the Far West*, and other Poems (1839); *On the Wisdom, Goodness, and Power of God as Illustrated in the Properties of Water* (1834); *On the Cryptogamous Origin of Malarious and Epidemic Fevers* (1849); and *Five Essays on Various Chemical and Medical Subjects* (1858).

MITCHELL, MARIA (1818-1889), an American astronomer. She studied under her father who was an astronomer, and in 1847 she discovered a comet, for which she received a gold medal from the King of Denmark. In 1865 she became professor of astronomy at Vassar College, which position she held till her death. Miss Mitchell was the first woman to be elected to the American academy of arts and sciences.

MITCHELL, SILAS WEIR, an American physiologist, born in Philadelphia, Pa., Feb. 15, 1829. He is celebrated for his researches on nerve-physiology and the poison of serpents, and for his valuable *Smithsonian Contribution*.

MITCHELL, SAMUEL LATHAM, an American naturalist and physician, born at North Hempstead, N. Y., Aug. 20, 1764, died in 1831. He was an active promoter of the study of natural science, and the author of several scientific works. He held many important educational and legislative offices.

MITFORD, WILLIAM, an English historian, born in London Feb. 10, 1744, died at Exbury, Feb. 8, 1827. He entered Queen's College, Oxford, but left without a degree. In 1761 he succeeded to the family estate of Exbury near the New Forest, and in 1769 became a captain in the South Hampshire militia, of which Gibbon was then major. By Gibbon's advice and encouragement he was induced to undertake his *History of Greece*. The author is an intense hater of democracy, and can see in Philip of Macedon nothing but a great statesman, in Demosthenes nothing but a noisy demagogue. Yet his zeal urged him, for the very purpose of substantiating his views, to search more minutely and critically than his predecessors into certain portions of Greek history, and the result was that Mitford's work held the highest place in the opinion of scholars until the appearance of Thirlwall and Grote. He sat in parliament from 1783 to 1818.

MITTWEIDA, a town of Saxony, 11 miles from Chemnitz. It has an engineers' and a weavers' school, and manufactures linen, woolen and cotton goods. Population, 9,461.

MIVART, ST. GEORGE, a distinguished naturalist, born in England in 1827. He was educated for the bar, but devoted himself to biological sciences. In 1862-84 he acted as professor of zoology and biology at the Roman Catholic University College in Kensington, and in 1890 was appointed to the chair of philosophy of natural history at Lovain. He is known as an able and zealous opponent of the "Natural Selection" theory. Among his works are *The Genesis of Species; Man and Apes; Contemporary Evolution; Lessons from Nature; The Cat; Nature and Thought; and The Origin of Human Reason*.

MIZEN, the sternmost of the masts in a three-masted vessel.

MNEMOSYNE, in Greek mythology, the daughter of Uranus, and mother of the nine muses by Zeus. The principal seat of her worship was at Eleuthera, in Boeotia.

MOBERLY, GEORGE, an English author and educator, born about 1803, died July 6, 1885. He was long head-master of Winchester School, and in 1869 became bishop of Salisbury. His writings were mostly theological.

MOBERLY, a city and railroad center of Randolph county, Mo., 148 miles west of St. Louis. It contains the shops of the Wabash Western Railroad Company, flour and planing mills, and repair shops for all kinds of machinery. Population in 1890, 8,215.

MOBILE, a city of Alabama. Population in 1890, 31,822. See *Britannica*, Vol. XVI, pp. 539-540.

MOCCASIN, the shoe of the North American Indian, made all of soft hide, and often ornamented. The Moccasin Snake (*Toxicophis piscivorus*) of North America is a brown-colored poisonous swamp snake; the skin is marked with black bars.

MOCK ORANGE, the name applied in England to the Syringa, and in the United States to the *Prunus Caroliniana*, a small evergreen resembling the cherry-laurel.

MODESTO, a post-village, the county-seat of Stanislaus county, Cal., 29 miles southeast of Stockton.

MODJESKA, HELENA, a Polish actress, born in Cracow, Oct. 12, 1844. She began to act in a traveling company in 1861 and four years later she made a great name at Cracow, and from 1868 to 1876 was the first actress at Warsaw. Then she settled with her second husband near Los Angeles, Cal., to try farming; but the enterprise not succeeding, she returned to the stage, and won a complete triumph as Adrienne Lecouvreur at San Francisco in 1877, although she acted in English, of which language she had known nothing seven months before. Since that time she has been acknowledged one of the best of modern emotional actresses, achieving her greatest triumph, both in the United States and in Great Britain, in such rôles as Juliet, Rosalind, Beatrice, and in the *Dame aux Camélias* and Sardou's *Odette*.

MODOSCS. See **NORTH AMERICAN INDIANS**, in these Revisions and Additions.

MODULATION, in **MUSIC**. When in the course of a melody the keynote is changed, and the original scale altered by the introduction of a new sharp or flat, such change is called modulation. The art of good modulation from one key to another consists in the proper choice of intermediate chords. Sudden transitions, without intermediate chords, should be employed but sparingly.

MOFUSSIL (from an Arabic word meaning "separate") a term commonly used by Anglo-Indians for the rural part of a district as opposed to the administrative headquarters. Thus in Bengal the Mofussil means practically the whole province beyond the city Calcutta.

MOGUER, a town and small port of Spain, on the Rio Tinto, near its mouth, and eight miles east of Huelva, with some trade. Population, 8,322.

MOHAIR. See *Britannica*, Vol. XVI, p. 544.

MOHARRAM, the first month of the Mohammedan year, kept by the Shiite Mohammedans as a month of feasting and mourning, in commemoration of the sufferings of Hassan and Hussein, nephews of the Prophet. A celebrated passion-play is performed during this month in honor of the two saints at several towns in Persia and India.

MOHAVE INDIANS. See **NORTH AMERICAN INDIANS** in these Revisions and Additions.

MOHAVE DESERT, a basin, with little water or vegetation, chiefly in the southeast of California, and extending into Arizona. The Mohave River rises in the San Bernardino range, and finally disappears in the Mohave Sink.

MOHAWKS. See NORTH AMERICAN INDIANS in these Revisions and Additions.

MOHEGANS. See NORTH AMERICAN INDIANS in these Revisions and Additions.

MOHL, HUGO VON, a German botanist, born at Stuttgart in 1805, died at Tübingen in 1872. He studied medicine at the University of Tübingen, and in 1835 was made professor of botany there. He was in his time the highest authority on vegetable anatomy and physiology. He published *Beiträge zur Anatomie und Physiologie der Gewächse; Grundzüge zur Anatomie und Physiologie der vegetabilischen Zelle* (1851); and *Vermischte Schriften*.

MOIRE (from the French verb *moirer*, "to water," silk in a large pattern, as distinguished from *tabiser*, to water or weave it in a small pattern), silks figured by the peculiar process called "watering." They are wetted, and then folded with particular care, to ensure the threads of the fabric lying all in the same direction, and not crossing each other, except as in the usual way of the web and the warp. The folded pieces of silk are then submitted to an enormous pressure, generally in a hydraulic machine. By this pressure the air is slowly expelled, and in escaping draws the moisture into curious waved lines, which leaves the permanent marking called watering.

MOLESCHOTT, JAKOB, a Dutch physiologist, born at Bois-le-Duc, Aug. 9, 1822. He studied medicine at Heidelberg, and taught there physiology, anatomy and anthropology from 1847 until 1854, when he resigned his chair, the senate of the university having "warned" him on account of the strong materialistic tendency of his writings. In 1853 he established a private laboratory and worked in it until 1856, when he was nominated professor of physiology at Zürich; in 1861 he moved to the university of Turin, and in 1878 to that of Rome. He has written *Untersuchungen zur Naturlehre des Menschen und der Tiere; Licht und Leben; Kleine Schriften*, and other works.

MOLESWORTH, MRS. MARY LOUISA STEWART, novelist and popular writer for the young. She was born of Scotch parentage at Rotterdam, and her childhood was passed in Manchester and Scotland, and partly in Switzerland. She began to write when very young, and her first attempts were published when she was only sixteen. Her first complete works were written under the *nom de plume* of Ennis Graham, when she was about twenty-four. When she was about thirty she began to write for children and was at once successful, and has since held foremost rank in this department. She has also contributed largely to the better class of juvenile magazines.

MOLESWORTH, WILLIAM NASSAU, an English divine and historian, born at Southampton in 1816, and died in 1890. He is best known by his valuable *History of England From the Year 1830*. His brother GUILFORD, born at Millbrook in 1828, is an eminent civil engineer, and author of the popular *Pocket-book of Engineering Formulae*.

MOLINE, a city of Illinois. Population in 1890, 11,995. See *Britannica*, Vol. XVI, p. 631.

MOLTKE, HELMUTH, COUNT VON, field-marshal of the German empire, born at Parchim, in Mecklenburg-Schwerin, Oct. 26, 1800, died April 24, 1891. As chief of the general staff at Berlin he planned the Prussian campaign of 1866 against Austria, and the German campaign of 1870-71 against France. In 1812 he was sent to the military academy at

Copenhagen, where he remained under the strictest discipline for six years, and distinguished himself in the scientific branches of military study. In 1819 he became lieutenant in a Danish regiment, but on the separation of Denmark from Norway he determined to retire from the Danish and enter the Prussian service. This change being effected, he entered a Prussian regiment at Frankfurt. His parents having lost the whole of their property from war and misfortune, he had to undergo many hardships in order to maintain himself on the slender pay of a Prussian officer, and at the same time obtain instruction in foreign languages. In 1832 he was appointed to the staff, and for three years he continued to develop by scientific and exact study his extraordinary powers of combination and organization. He obtained leave to travel, and, arriving in Turkey at a critical moment, he was entrusted by the sultan with the task of remodelling the Turkish army, and remained with Mahmoud II. as military adviser till October, 1839, when he returned to his old position at Berlin. From 1858 to 1888 he was chief of the general staff in Berlin, and he at once commenced the re-organization of the Prussian army. He elaborated plans for the defense of the German coasts, and the creation of a German navy. His wonderful strategical power was displayed in the wars with Denmark in 1863-4, with Austria in 1866, and with France in 1870-71, bringing them all to triumphant issues. He married in 1845, Mary Burt, the daughter of an English gentleman residing in Holstein, but had no family, and his wife died in 1868. He was a man of great modesty and simplicity, and so reserved as to have gained the popular epithet of *The Silent*. His ninetieth birthday was the occasion of numerous honors at the hands of the emperor and the German people. He was the author of several important works, of which the first, *Letters from Turkey and the Campaign in Turkey*, were published in 1835, and the *Italian Campaign of 1859* in 1863. The *History of the German and French War of 1870-71*, published by the general staff in Berlin, was written entirely under his direction, and the greater part of it is actually from his pen. His *Letters from Russia*, written in 1856 to his wife, were published in 1877.

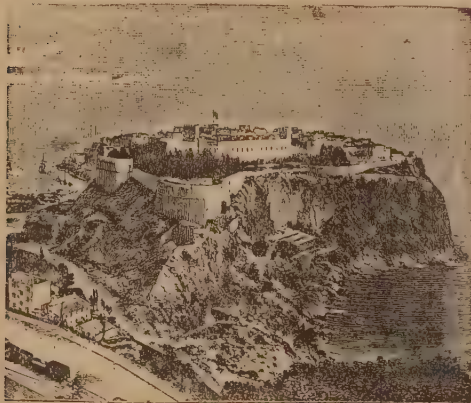
MOMIEN, a Chinese frontier town in the extreme west of Yunnan, 135 miles northeast of Bhamo.

MOMMSEN, CHRISTIAN MATTHIAS THEODOR, the most learned historian of Rome, born at Garding, in Sleswick, Nov. 30, 1817. He studied at Kiel, next spent three years traversing France and Italy in the study of Roman inscriptions under commission of the Berlin Academy, and in the autumn of 1848 was appointed to a chair of jurisprudence at Leipzig, of which two years later he was deprived for the part he took in politics. In 1852 he was appointed to the chair of Roman law at Zürich, in 1854 at Breslau, and in 1858 to that of ancient history at Berlin. Here he was engaged for many years in editing the monumental *Corpus Inscriptionum Latinarum*, and in 1873 he was elected perpetual secretary of the academy. In 1882 he was tried for slandering Bismark in an election speech, but was cleared both in the lower court and in that of appeal. His fine library was burned in 1880, whereupon a number of English students presented him with a collection of books to make good part of his loss. Freeman characterizes MommSEN as "the greatest scholar of our times, well-nigh the greatest scholar of all times . . . language, law, mythology, customs, antiquities, coins, inscriptions, every source of knowledge of every kind—he is master of them all." Of his brothers, two have achieved distinction: Tycho, born at Garding,

May 23, 1819, studied at Kiel, traversed Italy and Greece, and held educational appointments at Eisenach, Oldenburg, and Frankfort-on-Main until his retirement in 1885. August, born at Oldesloe, July 25, 1821, studied at Kiel, and taught in schools at Hamburg, Parchim, and Sleswick. Most of his works belong to the field of Greek and Roman chronology.

MOMPOX, or **MOMPOS**, a town of Bolivar in Colombia, on the Magdalena, 110 miles southeast of Cartagena. Founded in 1538; it contains a good secondary school and a distillery. Population, 8,000.

MONACO. For general article on this small principality see *Britannica*, Vol. XVI, pp. 717-718. The latest accredited reports place the area at eight square miles; population (in 1890), 12,000, of whom 3,292 were in the town of Monaco, 6,218 in Coudamine, and 3,794 in Monte Carlo. The capital is under French protection. Prince Albert (born in 1848, succeeded his father, Prince Charles III. Sept. 10, 1889), the present sovereign, has one son, Louis, by a marriage, dissolved in 1880, with Lady Mary Hamilton.* About 1,000 of the inhabitants are employed in the rooms and gardens of the celebrated Casino. These gambling-rooms, built at



MONACO.

Monte Carlo on ground leased from the Prince of Monaco, belong to a joint stock company, and have about 400,000 visitors. The climate of Monaco is milder than that of any other place in the Riviera; palms and aloes grow most luxuriantly, and rare wild-flowers are found on its rocky promontory. See Métiévier, *Monaco et ses Princes* (2d ed. 1865), and Boyer de Sainte-Suzanne, *La Principauté de Monaco* (1884).

MONA PASSAGE, a water-way for vessels between San Domingo and Porto Rico. On the west end of Porto Rico is Mayaguez Harbor opening directly out upon the Mona Passage. The water at the landing is not deep enough for vessels of large draft, and for them the anchorage is about a half mile from shore.

MONA ISLAND is a small, desolate, but beautiful island lying about the middle of the Mona Passage.

MONCALIERI, a town of Italy, on the Po, five miles south of Turin, with a royal palace (1470). Population, 3,463.

MONCKTON, ROBERT, a British general, governor of New York in 1762, and lieutenant-general in 1770. He died in 1782.

MONCONTOUR, a village in the French department of Vienne, 48 miles from Tours. It was the scene of the defeat of the Huguenots under Coligny by the troops of the King of France, Oct. 3, 1569.

MONEY. See *Britannica*, Vol. XVI, pp. 720-738.

MONITOR. See **NAVY**, in these Revisions and Additions.

MONK, MARIA (1817-50), a woman of bad character who pretended in 1835 to have escaped from the Hotel Dieu nunnery at Montreal, and who, coming to New York, found a good many credulous adherents, and published *Awful Disclosures and Further Disclosures*, which had an enormous sale.

MONMOUTH, a city, the county-seat of Warren county, Ill., 179 miles by rail west-southwest of Chicago. It is the seat of Monmouth College (United Presbyterian, 1856), with about 400 students, and manufactures agricultural implements, sewer pipes and cigars. Population in 1890, 5,837.

MONŒCIOUS, a term introduced by Linnaeus to those plants which have the stamens and pistil in different flowers, but on the same plant. Such plants formed one of the classes of the Linnaean system, but were obviously a specially artificial alliance, since that partial or complete separation of the sexes to which we apply the terms monœcious or dioecious respectively arises continually among the most unrelated plants or animals.

MONOGRAM, a character composed of two or more letters of the alphabet, often interlaced with other lines, and used as a cipher or abbreviation of a name. A perfect monogram is one in which all the letters of the word are to be traced.

MONOGRAPH, a work in which a particular subject in any science is treated by itself, and forms the whole subject of the work—"an all-sided and exhaustive study of a special or limited subject," as it has been called. Monographs have contributed much to our knowledge, especially in the department of the natural sciences. The term, however, is often loosely used for a small book on miscellaneous topics.

MONONGAHELA, a river which rises in West Virginia and flows north to Pittsburgh, where it unites with the Allegheny to form the Ohio.

MONONGAHELA CITY, a post-borough of Washington county, Pa., 21 miles south of Pittsburgh. It contains a strawboard paper-mill, planing-mills, manilla paper-mill, and gas works. There are coal-mines in the vicinity. Population 4,086.

MONROE, a city, the capital of Ouachita parish, in the northern part of Louisiana on Ouachita River. Population, 3,251.

MONROE, a post-village, the county-seat of Union county, N. C., in the southern part of the State, near a branch of the Yadkin River. It manufactures carriages.

MONROE, a post-village, the county-seat of Green county, Wis., on a branch of the Chicago, Milwaukee & St. Paul Railroad. It has a foundry and wagon factories. Population 3,865.

MONROE DOCTRINE. See *Britannica*, Vol. XIII, p. 192; Vol. XVI, p. 761; Vol. XXIII, p. 762.

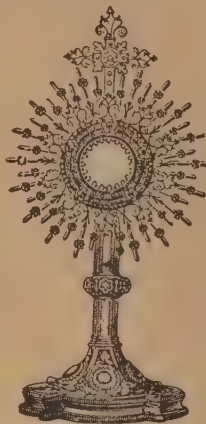
MONROEVILLE, a post-village and a railroad center of Huron county, Ohio, sixty miles west of Cleveland. It has grain warehouses, and manufactures flour, beer and woolen goods.

MONSIGNOR, a title of honor given to prelates of the Roman Catholic Church. Formerly in France the corresponding title of *Monseigneur* was allowed to all high dignitaries of the church, to the princes of the blood royal, to the higher nobles, and

*The marriage was declared dissolved by the Pope of Rome, Jan. 3, 1880, and by the reigning prince, July 28, 1880.

to the presidents of the superior law-courts. But from the time of Louis XIV. Monseigneur without further addition was appropriated as the title of the Dauphin.

MONSTRANCE, the sacred utensil employed in the Catholic Church for the purpose of presenting the consecrated host for the adoration of the people, as well while it is carried in procession as when it is exposed upon the altar on occasions of special solemnity and prayer. It consists of two parts, the foot or stand upon which it rests, and the repository or case in which the host is exhibited. The latter contains a small semi-circular holder called the *lunula*, or crescent, in which the host is fixed. It is commonly in the form of a star or sun with rays, the central portion of which is of glass or crystal, and serves to permit the host to be seen.



Monstrance.

MONTAGUE, a village of Muskegon county, Mich., situated on White Lake, five miles east of Lake Michigan. It is a commercial town and is especially noted as a shipping point for peaches.

MONTCLAIR, a post-village and a railroad center of Essex county, N. J., situated fourteen miles northwest of New York.

MONTALCINO, a cathedral city of central Italy. It stands on a hill (1900 feet), twenty-two miles southeast of Siena. Population, 2,353.

MONTALEMBERT, MARC RENÉ, MARQUIS DE, a French military engineer, grand-father of the orator and statesman, born at Angoulême in 1714, died in 1800. He was the author of *La Fortification Perpendiculaire*, and the originator of the modern application of the casemate to forts and batteries.

MONTANA, STATE OF. For general article on MONTANA, see *Britannica*, Vol. XVI, pp. 772-774. The United States census of 1890 reported the area and population of Montana as follows: Area, 146,080 square miles. Population, 132,159, a gain during the decade of 93,000. Capital, Helena, with a population of 13,834. Population of Butte City, 10,701.

The full list of governors of Montana with the dates of their official service, is as follows:

Sidney Egerton.....	1864-65	J. Schuyler.....	1882-84
Francis Meagher.....	1865-66	B. Platt Carpenter.....	1884-85
Green Clay Smith.....	1866-69	Samuel T. Houser.....	1885-86
James M. Ashley.....	1869-70	Preston H. Leslie.....	1886-89
Benjamin F. Potts.....	1870-82	Joseph K. Toole.....	1889-93

Governor Toole's term expires Jan. 3, 1893. Salary of governor \$2,600.

ABBREVIATED HISTORIC OUTLINE OF MONTANA.—The part of Montana lying east of the Rocky Mountains was included in the "Louisiana Purchase," that part lying to the west was formerly included in Oregon and Washington. The Territory of Montana was first visited by the French in 1742-43, also by Lewis and Clarke in 1804-06. Gold was discovered in 1861; and mining began in earnest in 1862. The Territory was organized in 1864, and was admitted into the Union as a State Nov. 8, 1889.

Progress of population of Montana by decades: 1870, 20,595; 1880, 39,159; 1890, 132,159.

For numerous additional items relating to Montana, see the article UNITED STATES, in these Revisions and Additions.

In the absence of the reports of the official census of the chief towns of the State, (not yet published) the following estimates made for 1889, by E. L. Lomax, have been kindly furnished by the passenger department of the Union Pacific Railroad:

Towns.	Pop.	Towns.	Pop.
Anaconda.....	5,000	Wickes.....	1,000
Great Falls.....	4,250	Townsend.....	1,000
Phillipsburg including Granite and Rumsey.....	4,000	Castle.....	800
Bozeman.....	3,750	Bonner.....	750
Missoula.....	3,500	Carroll.....	750
Livingston.....	3,000	Choteau.....	750
Dillon.....	2,500	Empire.....	700
Deer Lodge.....	2,250	Grantdale.....	650
Billings.....	2,000	Frenchtown.....	600
Miles City.....	1,600	Forsyth.....	600
Boulder.....	1,500	Salesville.....	600
Marysville.....	1,400	Fort Maginnis.....	500
White Sulphur Springs.....	1,350	Jay Gould.....	500
Fort Benton.....	1,300	Ashley.....	500
Stevensville.....	1,250	Toston.....	500
Lewistown.....	1,200	Augusta.....	500
Corvallis.....	1,150	Park City.....	500
Elkhorn.....	1,100	Big Timbers.....	500
Glendive.....	1,050	Cottonwood.....	500
Malden.....	1,000	Basin.....	500
Virginia.....	1,000	Jefferson.....	500
Victor.....	1,000	Twin Bridges.....	500
Sheridan.....	1,000	Florence.....	500
Glendale.....	1,000	New Chicago.....	500
Thompson Falls.....	1,000	Cascade.....	500
		Chestnut.....	500
		Sun River.....	500

The land areas, and populations of the counties, severally, of the State of Montana in 1890 were as follows:

Counties.	Areas.	Pop. 1890.	Pop. 1880.
Beaver Head.....	4,200	4,655	2,712
Cascade.....	260	8,755	
Choteau.....	27,280	4,741	3,058
Custer.....	26,580	5,308	2,510
Dawson.....	26,680	2,056	180
Deer Lodge.....	5,085	15,155	8,876
Fergus.....	6,762	3,514	
Gallatin.....	2,295	6,246	3,643
Jefferson.....	1,850	6,026	2,464
Lewis and Clarke.....	26,000	19,145	6,521
Madison.....	4,250	4,692	3,015
Meagher.....	7,500	4,749	2,743
Missoula.....	1,850	14,427	2,537
Park.....	15,500	6,881	
Silver Bow.....	915	23,744	
Yellowstone.....	3,105	2,005	

MONTBRISON, a French town in the department of Loire, 35 miles southwest of Lyons, with mineral wells and some ribbon manufacture. Population, 6,235.

MONTALM, LOUIS DE, MARQUIS, a French general, born at Nismes in 1712, killed at Quebec in 1759. See *Britannica*, Vol. XX, p. 167; Vol. XXIII, p. 735; Vol. XXIV, p. 630.

MONT CENIS, or **MONTE CENISO**, an Alpine peak and pass between Savoy and Piedmont. Height of the mountain, 11,792 feet; of the pass, 6,884 feet. Over the pass a road was constructed (1802-10) by Fabbri, under Napoleon's orders, at an expense of \$1,500,000. Thirteen miles west of the pass a railway tunnel, seven and a half miles long, was begun in 1857 on the Italian side, and in 1863 on the French side, and was finished in 1870 at

a cost of \$15,000,000. Through this tunnel passes one of the main continental overland routes from London via Paris to Brindisi, for Asia, Australia and East Africa.

MONT-DE-MARSAN, the capital of the French department of Landes, at the confluence of the Midou and Douze, 92 miles by rail south of Bordeaux. It has a mineral spring and manufacturing of chemicals, iron, etc. Population, 10,714.

MONTE CATINI, a watering-place of Italy, 30 miles northwest of Florence. Its mineral springs are efficacious for abdominal complaints, scrofula and dysentery. The season lasts from May to September. Near here the Florentines were defeated by the Pisans in 1315.

MONTEFIORE, SIR MOSES (1784-1885), an English Jewish philanthropist, descendant of a family of bankers, born in Leghorn, Oct. 24, 1784, where his parents happened to be sojourning. His grandparents had emigrated from Leghorn to London in 1750. In 1812 he married Judith Cohen, a lady who went hand in hand with him in all his schemes of philanthropy. As a stock-broker he achieved great success. In 1818 he was elected president of the Spanish and Portuguese community. From 1829 onwards he took part in the struggle for removing the civil disabilities of English Jews.

In 1835 he was one of the parties to the contract for the \$75,000,000 given as compensation to the slave-owners. He was for a time high-sheriff of Kent, and, after long exclusion and repeated reelection, was legally admitted as sheriff of London in 1837. In that year he was knighted, and in 1846 was raised to a baronetcy. He distinguished himself by his sympathy with his countrymen in various parts of the East. He made seven journeys to the East, chiefly for the amelioration of the condition of his countrymen. At Bucharest, during an anti-Jewish ferment, he boldly faced the mob at the risk of his life. He was presented with the freedom of the City of London in 1873, and an address in 1883. In memory of his wife he endowed a Jewish college at Ramsgate in 1865. In his hundredth year he was still hale and well, but died July 29, 1885.

MONTEGUT, EMILE, a French critic, born at Limoges, June 24, 1826, and early made a reputation by a series of brilliant studies on English literature. He contributed to various journals, and has published books of travel, a study of Marshal Davout, and translations of Shakespeare, Macaulay and Emerson. Books of altogether exceptional value in their critical insight are *Poètes et Artistes de l'Italie*; *Tyees Littéraires*, et *Fantaisies Esthétiques*; *Essais sur la Littérature Anglaise*; *Nos Morts contemporains*; *Les Écrivains modernes de l'Angleterre*; *Œuvres et Ames des Pays d'Orient*; *Mélanges critiques*, and *Dramaturges et Romanciers*.

MONTENEGRO. For general article on MONTENEGRO, see *Britannica*, Vol. XVI, pp. 779-81. The latest authorized figures report the area at 3,630 square miles. The total population was stated in official returns to number 220,000 in 1879; a later estimate makes it 236,000. The capital is Cetinje, with 1,500 population; Podgoritz, 6,000; Duleigno, 5,000; Niskise, 3,000; Danilograd, 1,000. The population is mainly pastoral and agricultural. The Montenegrins belong almost entirely to the Servian branch of the Slav race.

The constitution of the country, dating from 1852, with changes effected in 1855 and 1879, is nominally that of a limited monarchy, resting on a patriarchal foundation. The executive authority rests with the reigning prince, while the legislative power is vested according to an "Administrative Statute" proclaimed March 21, 1879, in a state

council of eight members, one-half of them being nominated by the prince, and the other elected by the male inhabitants who are bearing, or have borne, arms. Practically, all depends on the absolute will of the prince. The inhabitants are divided into 40 tribes, each governed by elected "elders," and a chief or captain of district called *Knjez*, who acts as magistrate in peace and as commander in war. By the "Administrative Statute" of 1879, the country was divided into 80 districts and six military commands.

REIGNING PRINCE AND ROYAL FAMILY.—Nicholas I., Petrovic Njegos, was born October 7 (September 25), 1841. He was educated at Trieste and Paris, proclaimed Prince of Montenegro, as successor of his uncle, Danilo I., August 14, 1860. He was married, November 8, 1860, to *Milena Petrovna Vukotić*, born May 3, 1847, daughter of Peter Vukotic, senator, and vice-president of the council of state. Offspring of the union are six daughters and three sons, *Danilo Alexander*, heir-apparent, born June 29, 1871; *Mirko*, born April 17, 1879; *Peter*, born in 1889.

Prince Nicholas's nominal yearly income is fixed for the present at 9,000 ducats, or 4,100l. A yearly sum of 48,000 roubles, or 4,800l., has been received by Montenegro from Russia since the Crimean war, as a reward for its friendly attitude during that period. The Austrian government is stated to contribute about 30,000 florins per annum towards the construction of carriage roads in Montenegro.

FINANCES AND DEFENSE.—No official returns are published regarding the public revenue and expenditure. Reliable estimates state the former at 600,000 Austrian florins, or 60,000l. A loan of 1,000,000 florins was raised in Vienna in 1881 at an interest of 6½ per cent. on the salt monopoly of the principality, and 70,000l. is owed to Russia for grain supplied in 1879.

The number of men capable of bearing arms, between the ages of 17 and 60, is calculated at about 29,000. There exists no standing army, but all the inhabitants, not physically unfitted, are trained as soldiers, and liable to be called under arms. Recently the Moslem inhabitants of Duleigno have been exempted from military service on payment of a capitation tax.

The infantry are armed with the Russian Werndl rifle, of which 25,000 have been distributed, and the long 11-millimetre Gasser revolver. The artillery consists of 24 9-centimetre Krupp field pieces, and 24 mountain guns. By the Berlin treaty Montenegro is precluded from owning vessels of war.

Schools for elementary education are supported by government; education is compulsory and free; there were in 1889, 70 elementary schools, with 3,000 male and 300 female pupils. All males under the age of 25 years are supposed to be able to read and write. There is a theological seminary and a gymnasium or college for boys at Cetinje, and a girls' high-school maintained at the charge of the Empress of Russia.

MONTENOTTE, a small village of northern Italy, twenty-six miles west of Genoa, where Napoleon won his first victory over the Austrians, April 12, 1786.

MONTEPULCIANO, a town of Italy, a bishop's see, situated on a high hill, forty-three miles from Siena. It was the birth place of Politian and Belarmine, and is famous for its red wine. Population, 2,952.

MONTE ROSA, an Alpine mountain mass with four principal peaks, in the Pennine ridge which separates the Swiss canton of Valais from Italy. The highest peak, the Dufourspitze, 15,217 feet

nigh, is extremely difficult of ascent, and was first climbed by Mr. Smyth in 1855.

MONTESANO, a post-village, the county-seat of Chehalis county, Washington, sixty miles southwest of Olympia, on the south bank of the Chehalis River.

MONTEVIDEO, a post-village, the county-seat of Chippewa county, Minn., situated at the mouth of the Chippewa, where it enters the Minnesota River.

MONTÉZ, LOLA, adventuress, was born about 1820 at Limerick, died at Astoria, L. I., Jan. 17, 1861. She was christened Marie Dolores Eliza Rosanna, her father being an English Gilbert, and her mother of Spanish descent. Taken out to India, she there lost her father by cholera; and, her mother having re-married, Lola was sent home in 1826 to Europe, and brought up at Montrose, in Paris, and at Bath. To escape the match, arranged by her mother, with a gouty old judge, she eloped with a Captain James, whom in July 1837, she married at Neath; but the marriage ended in a separation and in her return from India. She now turned dancer, and after visits to Dresden, Berlin, Warsaw, St. Petersburg, and Paris, she came to Munich. There she soon won an ascendancy over the eccentric artist-king, Louis I., who created her countess of Landsfeld, and allowed her \$25,000 a year. For more than a twelvemonth she was all-powerful, her power directed in favor of Liberalism and against the Jesuits; but the revolution of 1848 sent her once more adrift on the world. Again she married, and, after touring through the States and Australia, and after two more "marriages" in California, in 1853 she delivered in New York a series of lectures written for her by C. Chauncey Burr. She died, a penitent, her last four months being devoted to ministering in a Magdalen asylum near New York, and was buried in Greenwood cemetery.

MONTGOMERY, FLORENCE SOPHIA, a popular writer of books for children, is the daughter of Sir Alexander Leslie Montgomery, Bart., of the Hall, County Donegal, Ireland. Her first book, *A Very Simple Story*, was warmly praised. Of its successors the chief are the widely popular *Misunderstood*; *The Town Crier*; *Peggy*, and *Other Tales*, and *The Blue Veil*.

MONTGOMERY, RICHARD. See *Britannica*, Vol. XXIII, p. 790.

MONTGOMERY, ROBERT (1807-1855), an English poet, born at Bath in 1807, the son of one Gomery, a famous clown. In 1830 he entered Lincoln College, Oxford; in 1833 took his B. A. with a fourth class; in 1835 was ordained, and was minister of Percy Street Chapel, London, until his death at Brighton, Dec. 3, 1855. Of his 31 works in verse and prose, two—*The Omnipresence of the Deity and Satan*—are still remembered by Macaulay's onslaught in the *Edinburgh "Review"*.

MONTGOMERY, a city of Alabama. Population in 1890, 21,790. See *Britannica*, Vol. XVI, p. 790.

MONTGOMERY CITY, a post-village of Montgomery county, Mo., 82 miles west of St. Louis. Farming and dairying are the chief occupations. The place contains a college, mill and manufactory.

MONTI, VINCENTO (1753-1828), an Italian poet of the classical school, remarkable for his political tergiversation, anti-French, Napoleonist, pro-Austrian in turn. He was professor at Pavia, and, under Napoleon, state historiographer. His translation of the *Iliad* is admirable.

MONTICELLO, a city, the county-seat of Piatt county, Ill. It contains a steam-elevator and flour-mill.

MONTICELLO, a post-village, a railroad junction, and the county-seat of White county, Ind., 21 miles west of Logansport. It has manufactories of paper, furniture and woolen goods.

MONTICELLO, a city and railroad junction of Jones county, in the eastern part of Iowa.

MONTJOIE ST. DENIS, the French war-cry, old at least as Wace's day (12th century), from the hill near Paris on which St. Denis underwent the joy of martyrdom.

MONTMÉDY, a town and fortress in the French department of Meuse, 25 miles north of Verdun and 81 miles southeast of Sedan. It consists of two portions, the citadel and upper town overlooking the lower town, which lies in the valley of the Chiers, a tributary of the Meuse. Built and fortified in 1235, it was taken by the French in 1542, 1555, 1586 and 1657, and they, after it was definitely assigned to them by the peace of the Pyrenees (1659), had it re-constructed and re-fortified by Vauban. It was captured by the Germans in 1815 and again in 1870. Population, 2,740.

MONTROSE, a post borough, the county-seat of Susquehanna county, Pa., eight miles from Montrose Station. It is healthfully situated among the high hills, and is a pleasant summer resort.

MONTROSS, a post-village, the county-seat of Westmoreland county, Va., situated 52 miles southeast of Fredericksburg.

MONTYON PRIZES, rewards for single instances of disinterested goodness discovered throughout the year, awarded by the French Academy, according to the will of Jean-Baptiste-Robert Auger, Baron de Montyon, who bequeathed \$600,000 to public hospitals, and the remainder of his fortune to give sums of money to poor patients on leaving Paris hospitals, and to found the prizes since connected with his name. The Academy of Sciences awards annually a prize of 10,000 francs to the individual who has discovered the means of making any mechanical occupation more healthy, another of equal value for improvements in medicine and surgery; while the Forty themselves award the prize of virtue, and another to the writer of the work likely to have the greatest beneficial influence on morality—both alike of 10,000 francs a year.

MOODY, DWIGHT LYMAN, an American evangelist, born at Northfield, Mass., Jan. 5, 1837. He was for a while a salesman in Boston, and in 1856 went to Chicago, where he engaged with remarkable success in missionary work. In 1870 he was joined by Ira David Sankey, who was born at Edinburgh, Pennsylvania, Aug. 28, 1840. In 1873 they visited Great Britain as evangelists, attracting great crowds, and afterwards worked together there and in America. Mr. Moody is the founder of Northfield seminary, a flourishing Christian educational institution located in his native town.

MOON, MOUNTAINS OF, have played a mysterious part in African geography since the days of Ptolemy, who indicated them as containing the sources of the Nile. Their exact position was not known; they were generally figured on mediæval maps as a high range crossing the entire continent from Abyssinia to the Gulf of Guinea. As modern enterprise has opened up the interior of Africa different mountain-chains and peaks have been identified as Ptolemy's Mountains of the Moon.

MOONWORT, an interesting fern, widely distributed over northern Europe, penetrating to within the Arctic regions and Asia, and, with the few other species of which the family is composed, appearing also in North America.

MOORE, BENJAMIN, an American educator and divine, born at Newtown, N. Y., Oct. 16, 1748, died

in 1816. He was long connected as a minister with Trinity church, New York City; became bishop in 1801; and was president of Columbia College from 1800 to 1811.

MOORHEAD, a city, the county-seat of Clay county, Minn., situated on Red River. It contains a State normal school.

MOORE, FRANK, an American compiler and publisher, born in New Hampshire in 1828. He has produced a number of valuable works relating to American history.

MOORE, GEORGE H., an American author and librarian, born in New Hampshire in 1823. He has been librarian of the New York Historical Society and of the Lenox Library, and has written a number of historical works.

MOORE, JACOB BAILEY, an American writer of local histories, born in New Hampshire in 1797, died in 1853. He became librarian of the New York Historical Society in 1845, and was postmaster of San Francisco from 1848 until his death.

MOOSE. See *Britannica*, Vol. VII, p. 24.

MORAN, THOMAS, an American artist, born in England in 1837, but came to Philadelphia while a child. His magnificent paintings *The Grand Cañon of the Yellowstone* and *The Chasm of the Colorado* were bought by Congress for \$20,000. His brother **PETER** has devoted himself to the painting of animals, and his brother **EDWARD** to the production of marine subjects.

MORANO, a city of southern Italy, built on a hill in a wild neighborhood, 37 miles northwest of Cosenza. Population, 8,259.

MORATA, OLYMPIA FULVIA (1526-1555), an Italian authoress.

MORAVIA, a village of Cayuga county, N. Y., 18 miles southeast of Auburn. Woolens, cheese, flour and spokes are manufactured here, and the business of the surrounding region is largely dairying and stock-raising.

MORAVIAN CHURCH. See *Britannica*, Vol. XVI, pp. 811, 812. See also **RELIGIOUS DENOMINATIONS IN THE UNITED STATES** in these Revisions and Additions.

MORELLA, a town of Spain, eight miles north of Valencia. It was the stronghold of Cabrera, the Carlist general, who scaled the castle Jan. 25, 1839. It was re-taken in July, 1840, by Espartero. Population, 7,190.

MORELOS, JOSÉ MARIA (c. 1765-1815), a Mexican revolutionist, born about 1765. His birthplace, Valladolid, was re-named Morelia in his honor. He was the ablest of the leaders in the revolt of the Mexicans against the Spaniards. He was taken prisoner Nov. 15, 1815, borne in triumph to the city of Mexico and there shot.

MORENCI, a post-village of Lenawee county, Mich. It contains a woolen factory and a flour mill.

MORESNET, a small neutral territory, of about seventy acres, between Belgium and Prussia, five miles south-west of Aix-la-Chapelle. There is on it a village of 3,000 inhabitants.

MORETON-BAY CHESTNUT, a genus of plants so named because of the supposed resemblance in form and qualities of the seeds to the sweet chestnut of Europe. It is a native of Australia. The tree grows to the height of from seventy to one hundred feet, with spreading branches clothed with pinnate leaves about a foot long. The flowers, bright yellow and red, are succeeded by cylindrical pendulous pods of a bright brown color, six to eight inches long.

MORGAN, DANIEL, an American Revolutionary general, born in New Jersey in 1736, died in 1802. Congress voted him a gold medal for his victory at

the battle of Cowpens. He rendered good service in the suppression of the "whisky insurrection." He was a member of Congress from 1795 to 1799.

MORGAN, EDWIN DENNISON, an American merchant and statesman, born in Massachusetts in 1811, died in 1883. He became State senator of New York in 1843, and governor in 1859. He ranked as a major-general throughout the war, and became United States Senator in 1863. He twice declined the Secretaryship of the Treasury.

MORGAN, GEORGE WASHINGTON, an American soldier and statesman, born in Pennsylvania in 1820. He served with the Texan army of independence, in the Mexican war, and in the civil war. He was the Democratic nominee for governor of Ohio in 1865, and was a member of Congress from 1871 to 1875.

MORGAN, JOHN HENRY, a Confederate general in the civil war, born in Alabama in 1826, died Sept. 4, 1864. He became known as a very bold and successful raider, and his troops were known as "Morgan's guerillas." He was surprised by Union cavalry at Greenville, Tenn., and killed while attempting to escape.

MORGAN, LEWIS HENRY, an American archaeologist, born at Aurora, New York, Nov. 21, 1818, died Dec. 17, 1881. He graduated at Union College in 1840, and became a lawyer at Rochester. He served in the State assembly in 1861, and in the senate in 1868. Morgan's earliest work, *The League of the Iroquois* was the first account of the organization and government of an Indian tribe; but even more valuable are his *Systems of Consanguinity and Affinity of the Human Family*, and his treatise on *Ancient Society*.

MORGAN CITY, a post-village and port of entry of St. Mary's parish, Louisiana, on Atchafalaya River, eighty miles southwest of New Orleans. It has a good harbor and is connected by steamers with ports in Texas, Cuba, and Mexico. Population, 2,200.

MORGUE, a building in Paris, just behind the cathedral of Notre Dame, where the dead bodies of persons unknown, found either in the river (Seine) or in the streets, are exposed to public view for three days. The corpse is put under a glass case, on sloping slabs of marble. When a corpse is identified, it is handed over to the relatives or friends of the deceased, on payment of costs and dues; otherwise it is interred at the expense of the city. The number of bodies yearly exposed in the morgue is about 300, five-sixths of which are males. There are morgues in Berlin, and in Boston, New York, Brooklyn, Philadelphia, Chicago and other American towns. See *Britannica*, Vol. V, p. 331.

MORKE, EDUARD, a German poet, born in Württemberg, Sept. 8, 1804, died June 4, 1875.

MORISON, JAMES COTTER, an English author and positivist, born in 1831, died Feb. 25, 1888. He was educated at Highgate grammar-school and Lincoln College, Oxford. His first work was his masterpiece, *The Life and Times of St. Bernard*. His latest, *The Service of Man, an Essay Towards the Religion of the Future*, attracted much attention, but it was commenced when sickness had already seized him, and it does not adequately represent his views. He was one of the founders and first proprietors of the "Fortnightly Review." His intellectual gifts were associated with a most genial and kindly nature; he was reputed one of the best talkers of his time in French as well as English, and had long projected a work on the history of France, but owing to ill health it was never begun.

MORLEY, HENRY, an English author, born in London, Sept. 15, 1822, and educated at the Moravian school, Neuwied-on-the-Rhine, and King's Col-

lage, London, where he edited the "King's College Magazine." After practicing medicine at Madeley, from 1844 till 1848, and keeping school for the next two years at Liscard, Liverpool, he settled down in London to literary work in connection with "Household Words" and the "Examiner." Of the latter he was joint-editor from 1856 to 1859, and sole editor from that year till 1864. He was English lecturer at King's College for eight years previous to 1865, when he became professor of English language and literature at University College, London. In 1870 he was appointed examiner in English language, literature, and history to the university of London. No other man has done so much to make classical literature accessible to the people as Henry Morley through his admirable series, *Morley's Universal Library*, embracing sixty-three volumes; *Cassell's National Library*, 209 volumes, and the *Carisbrooke Library*, a series of volumes issued in alternate months.

MORLEY, JOHN, an English writer and statesman, born at Blackburn, Dec. 24, 1838. He was educated at Cheltenham and Lincoln College, Oxford, and, after taking his degree in 1859, was called to the bar, but chose literature as a profession. The best known of his books are *Edmund Burke*; *Critical Miscellanies*; *Voltaire*; *On Compromise*; *Rousseau*; *Diderot* and the *Encyclopédistes*, and *Richard Cobden*. From 1867 till 1882 he edited the "Fortnightly Review," and he has edited the "English Men of Letters" series. He is an honorary LL. D. of Glasgow. He unsuccessfully contested Blackburn in 1865, and Westminster in 1880. From 1880 to 1883, when he was elected for Newcastle-on-Tyne, Mr. Morley was editor of the "Pall Mall Gazette." His articles in favor of Home Rule written then, and followed up by action in the house of commons and speeches in the country in 1885, did much to influence public opinion before Mr. Gladstone's change of policy was known. In 1886 he became Irish secretary till the dissolution which followed the rejection of the Home Rule bill in that year. In 1890, during the difficulty as to the leadership of the Irish party, he directly supported Mr. Gladstone.

MORLEY, SAMUEL, an English merchant and philanthropist, born at Homerton, Oct. 15, 1809, died Sept. 5, 1886. He was returned to parliament for Nottingham, in the Liberal interest, in 1865; was unseated on petition; represented Bristol, 1868-65, and declined a peerage which was offered to him in the latter year. He was identified with many religious and philanthropic movements. He gave \$30,000 towards the erection of a Nonconformist memorial hall, and during 1864-70 contributed \$70,000 towards the erection of Congregational chapels.

MORLEY, THOMAS (c. 1545-1604), an English composer. In 1601 he published the work by which he is now known, *The Triumphs of Oriana*, being a collection of 24 madrigals in honor of Queen Elizabeth, written by 24 Englishmen and set to music by Morley.

MORMONS. On Jan. 12, 1887, the House of Representatives passed without division a bill for the suppression of polygamy in the Territory of Utah. Its chief provisions are: (1) Polygamy is declared to be a felony; (2) The chief financial corporations of the Mormons are dissolved, and the attorney-general is directed to wind them up by process of the courts; (3) Polygamists are made ineligible to vote; (4) All voters in Utah are to be required to take an oath to obey the laws of the United States, and especially the laws against polygamy; (5) Woman suffrage in Utah is abolished, and (6) Lawful wives and husbands are made competent witnesses against persons accused of polygamy. It

was reported in September, 1890, that polygamy had been declared to be no longer a feature of the Mormon teaching, and that it was the intention of the sect to submit to the ordinary laws binding on Americans. See *Britannica*, Vol. XVI, pp. 825-828.

MOROCCO. See under LEATHER, *Britannica*, Vol. XIV, pp. 388, 389.

MOROCCO. For general article see *Britannica*, Vol. XVI, pp. 830-836. According to the most recent investigation the area of the Sultan's dominions is about 219,000 English square miles. The estimates of the population of Morocco vary from 2,500,000 to 9,400,000; it is generally considered to be about 5,000,000 souls, although Dr. Rohlf, in the "Geographische Mittheilungen" (1883), maintains that the population is not more than 2,750,000. An estimate of 1889 gives the following results: The region of the old kingdom of Fez, 3,200,000; of Morocco, 3,900,000; of Taflet and the Segelmesa country, 850,000; of Sus, Adrar and the Northern Draa, 1,450,000; total, 9,400,000. Again, as to race: Berbers and Tuaregs, 3,000,000; Shella Berbers, 2,200,000; Arabs (1) pure nomadic Bedouins, 700,000; (2) Mued, 3,000,000; Jews, 150,000; negroes, 200,000. The number of Christians is very small, not exceeding 1,500. Much of the interior of Morocco is unknown to Europeans.

PRESENT REIGNING FAMILY AND GOVERNMENT.—The present sultan is Muley-Hassan, born in 1831, eldest son of sultan SidioMohamed. He ascended the throne at the death of his father, Sept. 17, 1873. He is known to his subjects under the title of "Emir-al-Mumenin," or Prince of True Believers. He is the fourteenth of the dynasty of the Alides, founded by Muley-Achmet, and the thirty-fifth lineal descendant of Ali, uncle and son-in-law of the Prophet.

The form of government of the sultanate, or empire of Morocco, is in reality an absolute despotism, unrestricted by any laws, civil or religious. The sultan is chief of the state, as well as head of the religion. As spiritual ruler, the sultan stands quite alone, his authority not being limited, as in Turkey and other countries following the religion of Mahomed by the expounders of the Koran, the class of "Ulema," under the "Sheik-ul-Islam." The sultan has six ministers, whom he consults if he deems it prudent to do so; otherwise they are merely the executive of his unrestricted will. They are the vizier, the ministers for foreign affairs and home affairs, chief chamberlain, chief treasurer and chief administrator of customs. The sultan's revenue is estimated at \$2,000,000 per annum, derived from monopolies, taxes, tithes and presents.

In 1833 the sultan granted the claim of Spain to the small territory of Santa Cruz de Mar Pequeña, near the mouth of the Ynu River, south of Mogador.

MORPHY, PAUL C., an American chess-player, born in New Orleans, in 1837, died in 1884.

MORRIS, CHARLES, an American commodore, born at Woodstock, Conn., in 1784, died at Washington, D. C., in 1856. He served with distinction in the war with Tripoli and in the war of 1812. He held many posts of responsibility in the navy department.

MORRIS, CLARA, an American actress, born in 1846 at Cleveland, Ohio. In 1874 she was married to F. C. Harriott, of New York.

MORRIS, FRANCIS ORPEN, an English author and divine, born at Beverley in 1810. He took orders in the Church of England, and became chaplain to the duke of Cleveland. He has written many valuable works on natural history.

MORRIS, GEORGE PERKINS, author of "Woodman, Spare that Tree," born in Philadelphia, Oct. 10, 1802, died in New York, July 6, 1864. He founded the New York "Mirror" and afterwards the "Home Journal," with both of which N. P. Willis was associated.

MORRIS, GEORGE SYLVESTER, an American philosophical writer and educator, born at Norwich, Vt., in 1840. He has been prominently connected with the University of Michigan and with the Johns-Hopkins University.

MORRIS, GOUVERNEUR, an American statesman, born in Morrisania, New York, Jan. 31, 1752, died Nov. 6, 1816. He graduated at King's (now Columbia) College in 1768, and was admitted to the bar in 1771. He took an active share in the political affairs of the Revolutionary period. In May, 1780, he lost a leg through a fall from his carriage in Philadelphia. From 1781 to 1784 he was assistant to Robert Morris, superintendent to the national finance. In 1787 he took his seat as a delegate in the convention that framed the United States Constitution. The greater part of the year 1791 he spent in England as a confidential agent of Washington, and next served till August, 1794, as United States minister to France. Returning to America in 1798, he sat for New York in the United States Senate from 1800 to 1803, and was chairman of the New York canal commissioners from 1810 till his death.

MORRIS, JOHN G., an American clergyman, educator and writer, born at York, Pa., in 1803. He is the founder of the village of Lutherville, Md., and of the female seminary there located. He is prominently connected with many scientific and other societies.

MORRIS, LEWIS, one of the signers of the Declaration of Independence, born at Morrisania, N. Y., in 1726, died in 1798. He was a half-brother of Gouverneur Morris.

MORRIS, LEWIS, an American colonial governor, born at Morrisania, N. Y., in 1671, died in 1746.

MORRIS, LEWIS, a popular English poet, born in Carmarthen in 1835. He was educated at Sherborne School and at Jesus College, Oxford, where in 1855 he graduated first-class in classics, and won the Chancellor's prize. He was called six years later to the English bar, and practiced till 1881, when he accepted the post of honorary secretary to the university of Wales. His first offerings of verse appeared in 1871, when under the pen-name of "A New Writer" he published *Songs of Two Worlds*, which at once passed into numerous editions, and which was followed by a second and third volume. In 1876 appeared *The Epic of Hades*, the work with which the author's name is usually associated; it has run into several series, and these series into many editions. He has since published *Gwen, a Drama*; *The Ode of Life*; *Songs Unsung*; *Gydia, a Tragedy*; and *A Vision of Saints* (1890).

MORRIS, RICHARD, an English philologist, born at Bermondsey in 1833. He is an active member of the Chaucer and the Early English Societies, and president of the Philological Society. He has written many valuable philological works, and edited numerous early texts.

MORRIS, THOMAS, a bishop of the Methodist Episcopal Church, born in West Virginia in 1794, died in 1874.

MORRIS, WILLIAM, artist and poet, born at Walthamstow in 1834, and educated at Marlborough and Exeter College, Oxford. Mr. Morris turned his attention for some time to the study of architecture; and in 1868, together with his friends Dante G. Rossetti and Burne Jones, endeavored to

elevate the artistic taste of the public. For this purpose a business of "art fabrics," wall-papers, and stained glass, was started which has been extremely successful. Mr. Morris published in 1867 his poem *The Life and Death of Jason*, which was followed in 1868-70 by *The Earthly Paradise*, a series of twenty-four romantic tales. His later works include *Love is Enough*; *The Story of Sigurd the Volsung*; and *Hopes and Fears for Art*. He has recently translated the Odyssey of Homer, and in conjunction with Mr. Eirikr Magnusson rendered into English verse a number of Icelandic Stories. Mr. Morris is one of the leaders of the socialistic movement in England. A book by him entitled *The Glittering Plain*, appeared in 1890.

MORRIS, a city, the county-seat of Grundy county, Ill., one of the largest grain-markets of the West. It manufactures plows, cultivators, school furniture, and carriages, and contains bituminous coal-mines.

MORRIS, a post-village, a railroad junction and the county-seat of Stevens county, Minn., in the western part of the State on Pomme de Terre River, 159 miles northwest of St. Paul.

MORRISBURG, a town of Ontario, a port of entry, situated on the St. Lawrence, ninety-two miles west of Montreal. It does an extensive shipping business, and has a valuable water-power.

MORRISON, a city, the county-seat of Whitesides county, Ill., 127 miles west of Chicago. It has several stores and mills.

MORRISTOWN, a village in St. Lawrence county, N. Y., opposite Brockville, Canada, on the St. Lawrence River.

MORRISTOWN, a post-village, a railroad junction and the county-seat of Hamblen county, Tenn., situated in a mineral region where variegated marble is obtained. The town contains two colleges.

MORRISVILLE, a post-village, the county-seat of Madison county, N. Y., thirty miles southwest of Utica. It is a hop-growing center.

MORSE, EDWARD S., an American naturalist, born in Maine in 1838. He has been professor of zoölogy in Bowdoin College and in Harvard University; has written several works on natural history, and is a popular scientific lecturer.

MORSE, JEDIDIAH, an American geographer, father of the inventor of the telegraph, born in Woodstock, Conn., Aug. 23, 1761, died in 1826. He is best known as the author of *Morse's Geography*.

MORTARA, EDGAR, a Jewish boy who, in 1858, was forcibly carried off from his parents by the orders of the archbishop of Bologna, on the plea that he had, when an infant, been baptized into Christianity by a Roman Catholic maid-servant. The manner of the boy's abduction, and the refusal of the Roman Catholic authorities to give him up to his parents, becoming known throughout Europe, excited great indignation, more particularly in England. But the boy remained in the hands of the Roman Catholic church, and became an Augustinian monk.

MORTAR-VESSEL, a class of gunboat for mounting sea-service mortars. The most ancient form of mortar-vessel was the "bomb-ketch," convenient because of the length of deck without a mast.

MORTON, GEORGE, born at York, England, about 1585. He was an active promoter of immigration among the Plymouth Colonists; and was the editor of "Mourt's Relation," the first account published in England of the planting of the colony.

MORTON, HENRY, a distinguished American chemist, born in New York City in 1836. He has been a voluminous writer on scientific subjects. He

became president of the Stevens Institute of Technology in 1870.

MORTON, JAMES ST. CLAIR, an American military engineer, born in Philadelphia in 1829. He was killed in the assault on Petersburg, June 17, 1864.

MORTON, LEVI PARSONS, vice-president of the United States, born at Shoreham, Vermont, May 16, 1824. He was first a country store-keeper's assistant, then partner in a Boston firm of merchants, and in 1863 founded banking-houses in New York and London. In 1878 and 1880, he was returned to Congress as a Republican; in 1881 to 1885, he was minister to France, and in 1888 he was elected vice-president of the United States.

MORTON, NATHANIEL (1613-1685), brother of George, the Plymouth colonist. He wrote several works on the early history of New England.

MORTON, OLIVER PERRY, an eminent American statesman, born in Indiana in 1823, died in 1877. He was governor of Indiana during the civil war, and became United States Senator in 1867.

MORTON, SAMUEL GEORGE, a distinguished American physician and naturalist, born in Philadelphia, Jan. 26, 1799, died May 15, 1851. He studied medicine in Philadelphia and Edinburgh, and in 1839 was appointed professor of anatomy in the Pennsylvania Medical College. Morton may be regarded as the first American who endeavored to place the doctrine of the original diversity of mankind on the scientific basis. His great works are *Crania Americana*, and *Crania Aegyptiaca*. His museum of comparative craniology, in the academy of natural sciences, Philadelphia, contains some 1,500 skulls, 900 of them human.

MORTON, THOMAS (c.1590-c.1646), brought a colony from England to Massachusetts in 1622. He came into conflict with the Puritans on the question of worldly amusements, and published a satire called *The New English Canaan*, which gives an excellent description of the country.

MORTON, WILLIAM T., an American dentist, born in Massachusetts in 1819, died in 1868. He is distinguished as the discoverer of the use of ether as an anæsthetic.

MOSES. See *Britannica*, Vol. XVI, pp. 860-61.

MOSKWA, a branch of the Oka. It rises in a marsh in the east of Smolensk, flows east to the city of Moscow, and thence to the Oka. It is navigable from its mouth to Moscow, except between November and April, when it is generally frozen, and is connected directly with the Volga by the Moskwa Canal.

MOSTAGANEM, a town of Algeria, on the coast, forty-five miles north-east of Oran. It manufactures pottery and has corn-mills and tanneries. Population in 1886, 12,395, more than one-third being Europeans. It was a place of 40,000 in the 16th century; and has again grown up from its decayed state since the French took possession in 1833.

MOTHE CADILLAC ANTOINE. See *CADILLAC*, in these Revisions and Additions.

MOTIFF, in a musical composition, the principal subject on which the movement is constructed, and which, during the movement, is constantly appearing in one or other of the parts, either completely or modified.

MOTT, LUCRETIA COFFIN, an American philanthropist, born at Nantucket in 1793, died in 1880. In 1819 she became a Quaker preacher, and thereafter was known as an able advocate of peace and an opposer of slavery.

MOUID, or MOULDINESS, the common name of many minute fungi which make their appearance, often in crowded multitudes, on decaying or diseased plants and animals, and animal and vegetable substances. To the naked eye they often seem like

patches of fine cobweb, which are shown by the microscope to consist of cellular threads.

MOULDING AND CASTING. See *Britannica*, Vol. IX, pp. 479-81.

MOULTON, LOUISE CHANDLER, an American writer, born in Poufret, Conn., April 5, 1835, married at twenty W. U. Moulton, a Boston publisher, and has published children's stories, novels, essays, and poems. Her stories are unaffected and well constructed, full of grace and tenderness; her verse reveals the rarer gift of lyrical music. Here may be named *Bedtime Stories*; *Some Women's Hearts*, and *In the Garden of Dreams* (1890), a volume of charmingly tender and pathetic verse.

MOULTON, a post-village, the county-seat of Lawrence county, Ala. It contains a boys' academy and a girls' institute.

MOULTRIE, JOHN, an English poet, born in London in 1799, died in 1874.

MOULTRIE, FORB, a fortress on Sullivan's Island, at the mouth of Charleston harbor, South Carolina, celebrated for the repulse of a British squadron commanded by Sir Peter Parker, Jan. 28, 1776. The fort, which had 26 guns and 435 men, and was commanded by Colonel William Moultrie (1731-1805), had been hastily built of palmetto logs, in two rows 16 feet apart, with the space between filled with sand. The spongy wood of the palmetto was found to resist the cannon balls perfectly.

MOULTRIE, WILLIAM, an American military commander, born in South Carolina in 1731, died in 1805. He fought with distinction in the Revolutionary war.

MOUND-BIRDS, a family of galinaceous birds remarkable for the large mounds which they build as incubators for the eggs. They are natives of Australasia and of the islands in the eastern archipelago and Pacific.

MOUND CITY, a post-village, the county-seat of Pulaski county, Ill., seven miles north of the mouth of the Ohio river. It contains a national cemetery and the western naval station.

MOUND CITY, a post-village, the county-seat of Linn county, Kan., on Little Sugar Creek. It has machine-shops, a foundry, and a system of water-works.

MOUNDSVILLE, a post-village, the county-seat of Marshall county, W. Va. It contains the State penitentiary, several saw, woolen, and rolling-mills, and a coal-bank. Here is situated the largest Indian mound in America.

MOUNTAIN, GEORGE, a Canadian bishop, son of Jacob Mountain, born in England in 1789, died in 1863.

MOUNTAIN, JACOB, a Canadian bishop, born in England in 1750, died in 1825.

MOUNT AYR, a post-village, the county-seat of Ringgold county, Iowa, in the southern part of the State, near the West Fork of Grand River.

MOUNT CARMEL, a city, the county-seat of Wabash county, Ill., on Wabash River. It contains manufacturing establishments, flour and saw-mills.

MOUNT CARMEL, a post-borough and a railroad junction of Northumberland county, Pa., containing mines of coal. Population, 8,243.

MOUNT CLEMENS, a city, the county-seat of Macomb county, Mich., twenty miles northeast of Detroit. It contains lumber manufactories, a furnace, and celebrated magnetic mineral springs. Population, 4,742.

MOUNT DESERT ISLAND, a mountainous island, fifteen miles long and twelve miles wide, south of Maine in the Atlantic Ocean. It contains beautiful lakes and several villages and is a favorite summer resort.

MOUNTFORD, WILLIAM, an American writer, born in England in 1816. He settled in Massachusetts as a spiritual minister. He died in 1885.

MOUNT GILEAD, a post-village, the county-seat of Morrow county, Ohio, 44 miles north of Columbus. It contains several mills and a carriage manufactory.

MOUNT HOLLY, a post-village, a railroad junction and the county-seat of Burlington county, N. J. The town is supplied with gas and water-works, and contains a children's home, iron-foundries, thread, saw, and planing-mills, machine-shops, and canning-factories.

MOUNT JOY, a post-borough of Lancaster county, Pa., twelve miles northwest of Lancaster. It contains a male and female seminary; Young Men's Christian Association, and a school for soldiers' orphans. It manufactures flour, carriages, and farm-implements.

MOUNT LEBANON, a post-village of Columbia county, N. Y., noted as the home of a community of Shakers. Horticulture, agriculture and broom-making are the chief industries.

MOUNT MORGAN, a gold-mining township of Queensland. The gold-mine at the summit of the mount is said to be the richest deposit in Australia. The gold is of unusual fineness and purity. The yield in 1887 was 83,705 ounces. Population in 1890, about 2,000.

MOUNT MORRIS, a post-village and railroad junction of Livingston county, N. Y. It manufactures plaster and lumber, and has an academy and seminary.

MOUNT PLEASANT, a city, the county-seat of Henry county, Iowa. It manufactures flour, wagons, sash and blinds, and contains Iowa Wesleyan University, an academy and a female seminary. In the vicinity is the State hospital for the insane. Population, 7,918.

MOUNT PLEASANT, a post-village, the county-seat of Isabella county, Mich. It is largely engaged in the lumber trade. Flour, sash and blinds are made here.

MOUNT PLEASANT, a post-borough of Westmoreland county, Pa., forty miles southeast of Pittsburgh. It is chiefly engaged in manufacturing lime and coke; in mining; and in shipping the limestone here quarried.

MOUNT PULASKI, a post-village and a railroad junction of Logan County, Ill., situated twenty-one miles northeast of Springfield and containing elevators and mills.

MOUNT STERLING, a post-village, the county-seat of Brown county Ill., midway between Quincy and Jacksonville. Coal is found near at hand, and in the village barrels, plows, wagons, and earthenware are manufactured.

MOUNT STERLING, a post-village, the county-seat of Montgomery county, Ky., a manufacturing town on the Chesapeake & Ohio Railroad. Population, 3,627.

MOUNT VERNON, a city of Ohio. Population in 1890, 6,016. See *Britannica*, Vol. XVII, pp. 4-5.

MOUNT VERNON, a city, the county-seat of Jefferson county, Ill., about 130 miles southeast of Springfield.

MOUNT VERNON, a city, a railroad center and the county-seat of Posey county, Ind. It is on the Ohio River and contains flour and lumber mills. Population, 4,710.

MOUNT VERNON, a post-village and a railroad junction of Westchester county, N. Y. It manufactures carriages, glue, horn and rubber jewelry, and pens.

MOUNT VERNON, a township of Fairfax county, Va. It contains the Washington homestead and

the tomb of George Washington and his wife. This historic property has been purchased by the Ladies' Mount Vernon Association.

MOUSQUETAIRES, the mounted body-guard of the kings of France, all of noble birth, organized by Louis XIII., in 1622. They rode gray horses, and were disbanded in 1815.

MOVILLE, a seaside resort in county Donegal, on Lough Foyle, nineteen miles northeast of Londonderry. It is a calling-station of the transatlantic steam-packets of the Anchor line. Population, 1,129.

MOVING PLANT, a plant of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, a native of India, remarkable for the spontaneous movement of the leaves.

MOXA, a peculiar form of counter-irritation which was early practiced in the East, particularly by the Chinese and Japanese, from whom it was learned by the Portuguese. One or more small cones, formed of the downy covering of the leaves of *Artemisia Moxa*, or of the pith of the common sunflower, or of linen steeped in nitre, are placed on the skin over the affected part, and the ends remote from the skin are ignited. The combustion gradually proceeds through the cone and forms a superficial eschar on the skin. The surrounding parts must be protected by a pad of wet rag, with a hole in it for the moxa.

MOZAMBIQUE CHANNEL, a channel between Madagascar and the east coast of Africa, about 1,000 miles in length and 400 in average breadth. At its northern extremity lie the Comoro Islands.

MOZIER, JOSEPH, an American sculptor, born in Vermont in 1812, died in Switzerland in 1870.

MSKET, also written *MTSCKETHA* and otherwise, probably the most ancient town of the Caucasus, and down to the 5th century the capital of the old Georgian kings. It stands on the south side of the Caucasus, ten miles north-northwest of Tiflis. It contains a cathedral, already existing in the 4th century, in which the Georgian kings were crowned and buried.

MUCH WOOLTON, a town of Lancashire, six miles southeast of Liverpool. Near it are large quarries. Population, 4,541.

MUCKERS, the popular name of a sect which sprung up at Königsberg in 1835. The movement seems to have originated in the dualistic and theosophic views of John Henry Schönherr concerning the organization of the universe by the combination of a spiritual and a sensual principle. In 1874 at Porto Alegre in Brazil, a band of German Muckers, under a prophetess, were nearly all killed in conflicts with the military.

MUDIE, CHARLES EDWARD, founder of the celebrated library which bears his name, born at Chelsea, England, in 1818, died Oct. 28, 1890. Having started as a bookseller, he established his library in 1842, which became a limited company in 1864, and had 25,000 members in 1890, the annual receipts being \$500,000.

MUDKI, often spelled *MOODKEE*, a village of the Punjab, India, twenty-six miles southeast of the Sutlej, on the old road from Ferozpur to Karnal. Here the first battle in the Sikh war of 1845-56, was fought, when the British under Sir Hugh Gough repulsed the Sikhs, and Sir Robert Henry Sale, "Fighting Bob," was killed.

MUEZZIN, the official attached to a Mohammedan mosque, who announces the different times of prayer.

MÜGGE, THEODOR, a German author, born in Berlin in 1806, died in 1861. He wrote many novels, tales, and sketches of travel.

MUGWUMP. A name given in common parlance to such citizens of political experience who refuse to subscribe from year to year to the principals laid down in the political platforms of the parties to which they have belonged, and to the methods pursued in the administration of the government by their own party officials. It was especially applied in 1888 to such of the Republicans as openly refused to support the Republican ticket in the national canvass of that year. The word means "big chief" in the Algonquin Indian dialects, and John Eliot, who spelled it "mugquomp," employed it to translate "leader" and "duke" (as in Gen. xxxvi. 15) in his Indian version of the Bible.

MÜHLBERG, a town of Prussian Saxony, on the Elbe, thirty-six miles southeast of Wittenberg. Population, 3,441. Here, April 24, 1547, the Emperor Charles V. defeated John Frederick the Magnanimous, elector of Saxony.

MÜHLENBERG, HENRY MELCHIOR, founder of the Lutheran church in America, born in Hanover in 1711, died in 1787. His eldest son, JOHN PETER (1746-1807), was a distinguished Revolutionary general. Another son, FREDERICK A. (1750-1801), was twice speaker of the House of Representatives. Another son, GOTTHILF HEINRICH (1753-1815), was an eminent botanist and an able theologian. WILLIAM AUGUSTUS (1796-1877), a great-grandson of Henry Melchior, was a distinguished poet and Protestant Episcopal divine.

MUIR, SIR WILLIAM, brother of John, was born in 1819. When eighteen years old he joined the Bengal civil service. He was made K. C. S. I. in 1867, and was lieutenant-governor of the northwest provinces, 1863-74, and financial minister to the government of India, 1874-76. After his return to England he sat on the council of India, 1876-85, when he was elected principal of the University of Edinburgh. He is an eminent Arabic scholar, and his *Life of Mohamet* and *Annals of the Early Caliphate* are works of solid and enduring value.

MUKADDASI, an Arab geographer, born at Jerusalem, voyaged extensively for twenty years, and described Moslem lands in a work published A. D. 985.

MULDER, GERARD JOHANNES (1802-80), a professor of chemistry at Utrecht, and best known from his investigations on protein and vegetable physiology.

MULFORD, ELISHA (1833-1885), an American author and divine. He was a professor in the Episcopal Divinity School at Cambridge.

MÜLLER, CHARLES LOUIS, a French artist, born in 1815. His paintings are chiefly historical.

MÜLLER, GEORGE, founder of the Orphan Homes, Ashleydown, Bristol, England, born near Halberstadt, Prussia, September 27, 1805. While in training for the ministry he was dissipated in his habits, and at sixteen he was sent to prison for defrauding an hotel-keeper. He went to Halle as a student of divinity, and a visit to a private meeting for praise and prayer proved the turning point in his career, and in 1856 he began to preach and teach, and took up his abode in free lodgings provided for poor divinity students. Through Tholuck's advice he came to London in 1829, and studied Hebrew and Chaldee with the view of becoming a missionary to the Jews. He settled at Teignmouth as minister of Ebenezer chapel, and in the conduct of his church abolished collections and depended on voluntary gifts. In 1855 he printed proposals for the establishment of an orphan house, which took shape in 1836 at Bristol. As the result only of "prayer to God" he announced that he had received \$422,205 up to 1856 on behalf of the

orphans, who then numbered 297. By 1875 upwards of 2,000 children were lodged, fed, and educated. In 1889 it was announced that the orphan homes and associated enterprises cost about \$180,000, which sum was the result of faith and prayer and voluntary subscriptions on the part of the public. Müller visited the East on an evangelistic tour in 1889. He has published *A Narrative of some of the Lord's Dealings with George Müller*.

MÜLLER, JULIUS, a German theologian, was born at Brieg, April 10, 1801, died at Halle, Sept. 27, 1878. He studied at Breslau and Göttingen, and adopted opinions in religion opposed to those of the rationalists. In 1825 he was appointed pastor at Schönbrunn, in 1831 second university preacher in Göttingen, in 1834 extra-ordinary professor of theology there, next year ordinary professor in Marburg, and in 1839 in Halle. His reputation as a theologian chiefly rests upon his great work on sin, *Die Christliche Lehre von der Sünde*.

MUMMIES, RECENT DISCOVERIES OF. On Feb. 6, 1891, a great discovery of mummies was made by M. Grébaut and his assistant, in the necropolis of Thebes. In extent and value it was second only to the discoveries of "Royal Mummies" Dehree-Bahri by M. Maspero, in 1881. About half a mile from Dehr-el-Bahari a pit was found containing several hundred magnificent mummies. These, like the royal mummies, had evidently been removed from the tombs and concealed in this receptacle, as a precaution, by the servants of the priests, probably at the same time and for the same reasons which caused the royal mummies to be placed in the receptacle where they were found by M. Maspero. This removal is believed by M. Maspero to have taken place in the reign of Aauputh, son of Shasang, of the twenty-second dynasty (*circa* 966 B. C.).

The coffins hitherto found all belong to the twenty-first dynasty, and are those of the priests of Ra-Amun and their families. The pit is about forty-five feet in depth, at the bottom of which are two corridors filled with coffins and treasures of every description. In the lower corridor—which as yet has only been explored—it is computed that there are some 200 coffins, and the second corridor is believed to be not less extensive. The shaft is forty-five feet deep, its mouth is about twelve feet in diameter, and its sides are of rough limestone. One of M. Grébaut's native assistants, who was superintending the work of hauling up the mummy cases, was the first to enter the corridor where the mummies and treasures lie. The shaft had then been excavated only as deep as to the mouth of the corridor; and he crept on his hands and knees, and stood in what he describes as being like a palace of enchantment. The corridor, he said, is some 10 or 12 feet high and 250 feet long. It runs in a northerly direction from the shaft toward the Theban hill. At the end there is a short corridor branching from it at right angles, and at some height above the floor at the end is the entrance to a second very long corridor, full of treasures.

Groups of mummies were found placed at intervals in families. The number in each group varies from two to six or seven, father, mother, and children, and around them, exquisitely arranged, are vases, models of houses, models of *dahabiehs*, cases and boxes full of *ushabti*s, statuettes, and every conceivable treasure of ancient Egypt. Without even a speck of dust upon them, this profusion of treasures had remained unlooked at by any eye for nearly 3,000 years. For general article on MUMMIES, see *Britannica*, Vol. XVII, pp. 20-22.

MUMPS. See *Britannica*, Vol. XVII, pp. 22, 23.

MUNCH, ANDREAS, a Norwegian poet, born in 1810. His cousin, PEDER ANDREAS, a historian, was born also in 1810, and died in 1863.

MÜNCH, FREDERICK, an American author, born in Germany in 1819, died in 1881. In 1865 he became a member of the Missouri senate. His writings were mostly in the German language.

MUNCIE, a city of Indiana. Population in 1890, 11,339. See *Brittanica*, Vol. XVII, p. 23.

MUNCY, a post-borough of Lycoming county, Pa. It has a female seminary and manufactories of lumber, flour and patent hay-forks.

MUNDEN, a town of Hanover, at the influx of the Werra and Fulda to the Weser. Enghirt by wooded hills, it has a school of forestry, an old castle, and manufactories of India rubber, glass and sugar. Population 7,053.

MUNKACS, a market-town of Hungary, situated at the foot of the Carpathians, 101 miles northeast of Debreczin. It has mines of iron and rock crystals, called Hungarian diamonds. The citadel, built on an isolated height, resisted the imperial arms for three years (1685-88); and, having fallen in 1848 into the hands of the Hungarians, was captured by the Russians in the following year. It is now a state-prison. Population, 9,691.

MUNKACSY, MICHAEL, painter, whose real surname is Lieb, was born at Munkacs, Oct. 10, 1846. He went a turner's apprentice to Vienna, and studied painting there, at Munich, and at Düsseldorf, and in 1872 settled in Paris. Except a few portraits, his works are nearly all genre-pictures. Three classes may be distinguished—those depicting Hungarian life, mostly very dark in coloring; those illustrative of the social life of Paris, much lighter and brighter in tone; historical pieces of which the best known examples are *Milton Dictating "Paradise Lost" to His Daughters*; *Christ Before Pilate*; *Crucifixion*, and *Mozart's Last Moments*. Vigorous characterization, dramatic power, and pictorial breadth are perhaps his most conspicuous traits.

MUNRO, HUGH ANDREW JOHNSTONE, a Latin scholar, born at Elgin in Scotland in 1819, died at Rome, March 30, 1885. He was educated at Shrewsbury and Trinity College, Cambridge, elected fellow of his college in 1843, and professor of Latin in his university in 1869. His greatest achievement was an edition of Lucretius, text, translation and notes, one of the finest and most brilliant works of British scholarship. His reputation stands high moreover as a writer of Greek and Latin verse; the best pieces were published along with a Latin translation of Gray's *Elegy* in 1884.

MURAL CIRCLE, an astronomical instrument for the observation of celestial bodies at their meridian passage. It consists of a large metal circle, turning on an axis the end of which projects from a solid stone pier or wall (whence the name), close to which the circle moves. The plane of the circle is set as nearly as possible in the meridian. Fixed immovably to the circle is a telescope, which by turning the circle is made to point to the star to be observed, at the time of its meridian passage. Two wires, one fixed and one movable, similar to those in the Transit Circle, enables the altitude, or zenith distance, of the star to be noted, if the instrument has been properly adjusted, and if the zenith or horizontal point on the circle be known.

MURE, SIR WILLIAM, of Rowallan in Ayrshire, a Scottish poet, born in 1594. He was wounded at Marston Moor, and died about the end of 1657. He translated into English sapphics Boyd of Trochrig's Latin poem, *Hecatombe Christiana*, but his principal work is his *True Croicifixe for True Catholikes*. His fine version of the Psalms dates from 1639.

MUREX, a genus of marine gasteropods in the same set as buckies, cone-shells, and cowries. The members prey upon other mollusks, boring by means of the usual rasper. The shells are fringed with spines in a quaint and beautiful fashion, to which some names, as "Venus Comb," obviously refer. Several species used to be crushed to furnish the famous dye of Tyrian purple.

MURFREESBOROUGH, a post-town, the county-seat of Rutherford county, Tenn., and formerly (1817-27), the State capital. It contains Union University, and Soule Female College. Population, 3,638.

MURPHYSBOROUGH, a city, the county-seat of Jackson county, Ill., on Big Muddy River, fifteen miles east of the Mississippi River.

MURRAY, ALEXANDER, a Scotch philologist, born at Dunkitterick Kirkcudbright, Oct. 22, 1775, died April 15, 1813. He had hardly any education save what his father could impart, yet by diligent and omnivorous reading of all such books as fell in his way or could be borrowed, he, when engaged as a shepherd, acquired, besides a scholarly knowledge of English literature, a mastery of the classics, all the principal European tongues, and Hebrew. The fame of the learned shepherd led to an invitation to Edinburgh, where he obtained a bursary, gave private lessons, and continued his linguistic labors, which were extended to Oriental tongues and ancient and modern Abyssinian. In 1806 he became minister of Urr, in 1812 professor of Oriental languages in Edinburgh University.

MURRAY, DAVID CHRISTIE, an English novelist, born at West Bromwich, April 13, 1847. He had served as reporter and then as war-correspondent for several newspapers, when in 1879 he published *A Life's Atonement* in "Chamber's Journal." Other works are *By the Gate of the Sea*, and *A Dangerous Catapult*. In 1889 he visited Australia and went on the stage.

MURRAY, EUSTACE CLARE GRENVILLE, the "Roving Englishman," born Oct. 2, 1819, died at Passy, Dec. 28, 1881. He served till 1849 in the Austrian army; in 1851 joined the British embassy at Vienna as attaché; in 1853-54, went on a special mission to the islands in the Ægean Sea; in 1857 was attaché at Teheran, and in the next year consul-general at Odessa. For exposing in the public press in 1866 certain abuses connected with the foreign office he was dismissed the service. He spent the rest of his life in Paris. As a journalist he is best known for his brilliant papers in the "Daily News" and "Pall Mall Gazette," and as an author by the *Roving Englishman*.

MURRAY, JAMES A. H., an English philologist, born at Denholm in 1837. He received his elementary education at Minto school, removed to Hawick, and was appointed assistant-teacher in the parish school there, and afterwards master of a subscription academy. He next removed to London, filling the post of foreign correspondent in the Oriental bank for some years; he afterwards became senior assistant-master at Mill Hill school. Dr. Murray has been twice president of the Philological society, is a graduate of London University, and LL.D. of Edinburgh University. The great work of his life, the editorship of the Philological Society's *New English Dictionary*, was begun while at Mill Hill, an iron building in his garden there being utilized for the assortment of the two tons of material to which he fell heir from his predecessors in the editorship, Herbert Coleridge and Dr. Furnivall. This work has been continued at Oxford, where Dr. Murray has, with a staff of assistants, devoted his whole attention to the task.

MURRAY, LINDLEY, an American grammarian, born at Swetara, Lancaster county, Pa., in 1745, died Feb. 16, 1826. He was educated at a school in Philadelphia belonging to the Society of Friends. On his father's removal to New York he was placed in a counting-house, but his thirst for study was so ardent that he escaped to a school in New Jersey. He was admitted to the bar at the age of 21, and commenced a good practice. During the Revolutionary war he engaged in mercantile pursuits with such success as to accumulate a fortune. In 1767 he went to England and purchased the estate of Holdgate, near York, where he devoted himself to literary pursuits. In 1787 he published his *Power of Religion on the Mind*, which passed through 19 editions, and was translated into French. His *Grammar of the English Language* was issued in 1795, and was followed by *English Exercises; the Key; the English Reader; Introduction, and Sequel* (both translated into French); a *Spelling Book; A First Book for Children; A Compendium of Faith and Practice*, and *The Duty and Benefit of a Daily Perusal of the Scriptures*. Murray's Grammar was for half a century the standard text-book throughout Britain and America. Murray wrote an autobiography to the year 1809, which was published after his death.

MUSCATEL (Ital. *moscado*, "musk"), the name given to many sweet, strong French and Italian wines, whether white or red.

MUSCATINE, a city of Iowa. Population in 1890, 11,432. See Britannica, Vol. XVII, p. 65.

MUSCHELKALK, the middle member of the Triassic system as developed in Germany. It consists chiefly of limestone—the series attaining a thickness of 550 to 1,100 feet. One of the most abundant and characteristic fossils of the muschelkalk is the lily encrinure.

MUSEUM (Gr. *mousetion*), originally the name given by the ancients to a temple of the Muses, and afterwards to a building devoted to science, learning and the fine arts. The first museum of this kind was the celebrated Alexandrian Museum, a meeting-place for learned men and a library, founded about 280 B. C. in the palace. After the revival of learning in Europe the term museum came to be applied to collections of antiquities and sculptures and paintings. Collections illustrative of natural history and other sciences now form a chief part of the treasures of many of the greatest museums, and there are museums devoted to particular branches of science, and to illustrating the industrial arts. The British Museum and that of South Kensington in London, the museums of the Vatican in Rome, of the Louvre in Paris, of St. Petersburg, Dresden, Vienna, Munich and Berlin, and the National Museum at Washington are among the greatest in the world.

MUSHROOM. See Britannica, Vol. XVII, pp. 74-76.

MUSIC. See Britannica, Vol. XVII, pp. 77-106.

MUSKEGON, a city, the county-seat of Muskegon county, Mich., on the Muskegon River, which here (four miles from its mouth in Lake Michigan) widens into Muskegon Lake, the best harbor on the east side of Lake Michigan. Muskegon is 40 miles by rail northwest of Grand Rapids, has daily steamboat communication with Chicago, and saws and ships enormous quantities of lumber. It has also a number of foundries, machine-shops, boiler-

works, etc. Population in 1880, 11,262; in 1890, 22,702. See Britannica, Vol. XVII, p. 108.

MUSK-GLANDS, skin-pits in mammals producing a secretion with a musky odor. They belong to a series of skin-glands, which occur in various parts of the body and with various secretions. The most notable musk-glands are those of the male musk-deer and the male beaver.

MUSK-PLANTS. Various parts of a number of plants smell more or less strongly of musk. Among these are the common little musk-plant and the musk-seed, The musk-tree of Jamaica, belonging to the natural order *Meliaceæ*, emits from all parts a smell of musk. All parts of *Guarea grandifolia*, another tree of the same order, sometimes called musk-wood, also smells strongly of musk.

MUSTANG, the small wild horse of the prairies and pampas of America. It is of Spanish origin, is very hardy, and is often broken for use.

MUSULMAN (Persian form of Arabic *Muslim*), a Moslem or Mohammedan. The termination "an" has nothing to do with our word *man*; and to make the plural Musulmen, instead of Musulmans, is absurd.

MUTA NZIGE, a lake of Equatorial Africa discovered by Stanley in 1876, and again seen by him in 1889, and re-named the Albert Edward Nyanza. It occupies the southern end of a vast natural depression, of which the Albert Nyanza fills the northern extremity.

MUTE, a small instrument used to modify the sound of the violin or violoncello. It is made of wood, ivory, or brass, and is attached to the bridge by means of a slit, its three legs standing between, but clear of, the strings. The use of the mute both softens the tone and imparts to it a peculiar muffled and tremulous quality, which is sometimes very effective. A mute, consisting of a pear-shaped leather pad, is sometimes used for the horn and trumpet. It is inserted into the bell of the instrument, thereby subduing the sound and producing the effect of great distance.

MYCALE, a wooded promontory of ancient Iona, over against Samos; in the channel between them, Leotychides the Spartan and Xanthippus the Athenian defeated the Persian fleet, 479 B. C.

MYER, ALBERT JAMES, an American military commander, and organizer of the weather bureau of the United States, born in Newburgh, N. Y., in 1823, died in 1880.

MYRCIA, a genus of trees of the natural order *Myrtaceæ*, to which belongs the Wild Clove of the West Indies, a handsome tree 20 or 80 feet high. Its timber is very hard, red and heavy, capable of receiving a fine polish, and much used for cogs of wheels. Its leaves have an aromatic cinnamon-like smell, and an agreeable astringency, and are used in sauces. Its berries have an aromatic smell and taste, and are used for culinary purposes.

MYRMIDONS, the followers of Achilles in the Trojan war. According to Greek legend, Zeus peopled Thessaly by transforming the ants into men; hence myrmidons (*myrmex*, "an ant").

MYSTAGOGUE: in the Greek religious system, the priest whose duty it was to direct the preparations of the candidates for initiation in the mysteries, as well as to conduct the ceremonial of initiation. The same name is applied in the Christian church to the clergy who prepared candidates for baptism, confirmation and the eucharist, especially the last.

N

NACHTIGAL—NAPIER OF MAGDALA

NACHTIGAL, GUSTAV (1834-1885), a German traveler, born at Eichstedt, Feb. 23, 1834. He studied medicine, and served as army surgeon until 1863, and in that year went to North Africa, suffering from a chest disease. In 1868, through the influence of Rohlf's, he was selected to carry presents from the King of Prussia to the Sultan of Bornu. Starting from Tripoli in 1869, he traveled by way of Fezzan and Tibesti to Bornu, made excursions into the States of Borgu and Bagirmi, and returned home by way of Wadai, Dar-Für, Kordofan and Cairo, where he arrived in 1874. This long and successful journey, in the course of which he visited, the first of Europeans, the native states of Tibesti, Borgu and Wadai, put him in the forefront of modern travelers. His vast collection of most valuable information was written down in *Sahara und Sudan*. In 1884 he was commissioned to annex for Germany Togoland, Cameroons and Lüderitzland (Angra Pequena) on the west coast of Africa. He died on the return journey off Cape Palmas, April 10, 1885, and was buried on that rocky promontory; but in 1887 his bones were removed to German soil in the Cameroons.

NAGA, in Hindu mythology, the name of deified serpents. Their king is Sesha, the sacred serpent of Vishnu.

NAGELFLUH, the Swiss name for a bed of conglomerate belonging to the Mollasse, which forms a considerable portion of the strata in the central region of Switzerland, between the Alps and the Jura. It is said to attain the enormous thickness of 6,000 and 8,000 feet in the *Rigi* near Lucerne, and in the Spier near Wesen.

NAGKESUR, the name under which the blossoms of the *Mesua ferrea* are sold in the bazaars of India.

NAG'S HEAD CONSECRATION, a calumnious legend with respect to Archbishop Parker's consecration, to the effect that he was consecrated in the Nag's Head Tavern, Cheapside. The election took place in the chapter-house at Canterbury, the confirmation at St. Mary-le-Bow's church in Cheapside, and the consecration in the chapel of Lambeth Palace.

NAGY, a Hungarian word, meaning "great." It is prefixed to the names of many towns in Hungary and Transylvania.

NAGY BANYA, a town of Hungary, near the Transylvania frontier. It is the center of a rich wine district, and is extensively engaged in the mining of gold and silver, and in the manufacture of earthenware. Population, 8,732.

NAGY ENYED, a town of Transylvania, on the Maros, 17 miles northeast of Karlsburg. It contains a famous Calvinistic college.

NAGY KAROLY, a town of Hungary, capital of the county Szathmar, 37 miles northeast from Debreczin, on a small feeder of the Theiss. It has several important annual fairs, and a trade in corn and cattle. Population, 10,670.

NAHANT, a summer resort on a small rocky peninsula of Massachusetts Bay, twelve miles northeast of Boston. Population, 880.

NAIHATI, a town of Bengal, twenty-three miles northwest of Calcutta. Population, 21,533.

NAIK, or **NAIGUE**, a native subaltern officer among Indian and Anglo-Asiatic troops, whose functions are somewhat analogous to those performed among European troops by the drill-sergeant.

NAIRS, a Mohammedan caste in Malabar, who have peculiar marriage customs, described by Colonel Drury in his *Keminiscences*, published in 1890.

NALA, a legendary king of ancient India, whose love for Damayanti, the daughter of Bhima, king of Vidarbha, and the adventures arising therefrom form a celebrated episode of the *Mahābhārata*, as also of a separate poem, the *Nalodaya*, attributed to Kālidāsa as its author.

NALODAYA, the name of a Sanscrit poem which is highly prized by the modern Hindus. Its subject is the story of Nala, which is more concisely narrated than in the episode of the *Mahābhārata*, whence its contents are borrowed. Its reputed author is Kālidāsa.

NANKEEN, a very durable buff-yellow fabric made of a kind of cotton grown in China. The plant which yields it is a mere variety of *Gossypium herbaceum*, the species which yields the ordinary white cotton of India and China. In the first half of the 19th century Nankeen cloth was much used for ladies' and children's attire, and for men's trousers. Imitations of it were made by dyeing white cotton, and the name "Nankeen" when now applied to certain kinds of cotton cloth is not confined to fabrics resembling genuine Nankeen cloth.

NANSEN, FRITHJOF, a Norwegian zoölogist and scientific explorer, born at Christiania in 1861. He became curator of the zoölogical department of the Bergen Museum in 1882; married in 1889 Mlle. Eva Sars, an eminent vocalist, daughter of Sars the zoölogist. Dr. Nansen is known as the leader of a scientific expedition across Greenland in 1889, and as the originator of a plan for the discovery of the North Pole by drifting. See ARCTIC EXPLORATIONS, in these Revisions and Additions.

NANTICOKE, a post-borough of Luzerne county, Pa., ten miles from Wilkesbarre, on a branch of the Susquehanna and opposite West Nanticoke. Coal is found here.

NAPA CITY, a post-village, the county-seat of Napa county, Cal., forty miles north of San Francisco.

NAPANEE, a town, the county-seat of Lenox county, Ontario. It contains a number of factories and mills, and is the center of a large local trade.

NAPERVILLE, a post-village of Du Page county, Ill., on Du Page River. It is the seat of the Northwestern College founded in 1861 by the Evangelical Association.

NAPIER OF MAGDALA, LORD. Robert Cornelis Napier born in Ceylon, Dec. 6, 1810, died in 1890. He was educated at the military college at Addiscombe, entered the Bengal engineers in 1826, served in the Sutlej campaign, and was wounded while acting as chief-engineer at the siege of Multan, and had a prominent share in the battle of Gujrat. As chief-engineer of the Punjab, with the rank of colonel, he greatly developed the re-

sources of the country. During the Indian mutiny he was chief-engineer in Sir Colin Campbell's army, and especially distinguished himself at the siege of Lucknow, and was made K.C.B. He received the thanks of parliament for his services in the Chinese war of 1858. As commander of the expedition in Abyssinia in 1868, he achieved a brilliant success, both by his whole management of the short campaign and in the storming of Magdala, which ended it. On his return he received the thanks of parliament, an annuity of \$10,000, was made G.C.B., and created Baron Napier of Magdala. In 1870 he was appointed commander-in-chief of the forces in India, and nominated a member of the Indian council. In 1876-82, he was governor of Gibraltar, and on resigning was made field-marshal, and in 1886 constable of the tower.

NAPLES, a post-village of Ontario county, N. Y., at the head of Canandaigua Lake, in a fruit-growing region. It has several flouring-mills and a manufactory of grape-boxes.

NAPLES YELLOW, a pigment used by artists. It consists of antimoniate of lead, and is obtained by the direct combination of antimonie acid and oxide of lead under the influence of heat.

NAPOLEON, a post-village, the county-seat of Henry county, Ohio, on the Maumee River, thirty-two miles southwest of Toledo. It has a foundry, machine-shops, and mills.

NAPOLEON, PRINCE. See BONAPARTE, in these Revisions and Additions.

NAPOLEONA (also called *Belvisia*), a tropical African genus of myrtaceous plants, of which the only known species (*N. imperialis*) has showy red, white, or blue flowers, and a fruit resembling a pomegranate.

NAQUET, ALFRED JOSEPH, a French chemist, born at Darpenas, France, in 1834. After studying medicine he was in 1863 appointed assistant professor at Paris. But in 1867 he was sentenced to fifteen months' imprisonment for organizing the socialist congress at Geneva and proposing there a resolution calling the first Napoleon the greatest criminal of his day. After publishing a book called *Religion, propriété, famille*, in which he attacked the religious idea of marriage, he was deprived of all civil rights. On the downfall of the French empire, he became military secretary to the governments at Tours and Bordeaux. In 1871 he was elected to the assembly. He opposed Gambetta, and demanded full political freedom for all classes, liberty of divorce, and many social innovations. In 1872 he separated peaceably from his wife because the latter insisted on giving their only son religious training. He has published *Principes de Chimie fondés sur les théories modernes* (1865); *De l'Atomistic* (1868); and has contributed to Wurtz's *Dictionnaire de Chimie*.

NARCISSUS, according to a Greek fable, the son of the river god Cephissus and of the nymph Liriope of Thespie. He was a youth of extraordinary beauty, of which he was excessively vain; and for this he was punished by Nemesis by being made to fall in love with himself on seeing the reflection of his own face in a fountain. He died of this love-sickness; and on the place where he died sprung up the flower which bears his name.

NARCOTINE, an alkaloid occurring in opium, in which it usually exists in the proportion of 6 or 8 per cent. It is nearly insoluble in water, but dissolves readily in alcohol, ether, and chloroform. Its ethereal solution, when submitted to spontaneous evaporation, yields it crystallized in colorless acicular groups or in rhombic prisms.

NARDO, a town of Italy, in the province of Lecce, eight miles northeast from Gallipoli. It has

manufactures of cotton goods and snuff, from cotton and tobacco grown in the neighborhood. The surrounding country abounds in olive plantations. Population about 8,500.

NARDOO, (*Marsilea Drummondii*), a plant of the natural order *Marsileaceae*, the only plant of that order which is used in any way by man. It is found in Australia, and affords important supplies of food to the natives of some regions. It grows in places occasionally covered with water; vegetating while moisture abounds, and then exhibiting abundance of green clover-like foliage, the leaves consisting of four leaflets at the top of a stalk some inches in length. When the water dries up, the remains of the plants are often covered with dried mud. It is then that the spore-cases are gathered for food.

NARDUS, a genus of grasses, having a simple spike, spikelets all on one side, no glumes; each spikelet consisting of one floret, which has two palea; the outer ending in a long point. *N. stricta* is a common grass, growing in tufts in dry elevated situations, and is often called mat-grass. It is perennial, purplish, short, rigid, and almost worthless, as few animals except goats will eat it.

NAREW, a river of Russia. It rises in the government of Grodno, and flows west-southwest to the main stream, which it joins at Sierock. The waters of the Narew are about as great in volume as those of the Bug. It is navigable to Tykoczin, 150 miles from its mouth.

NARIAD, a town in the presidency of Bombay, twenty-nine miles southeast of Ahmadabad. It carries on a great trade in tobacco and ghee, and has a government experimental farm. Population, 28,304.

NARO, a town of Sicily, in the province of Girgenti, and 14 miles east of the town of that name. It has 10,000 inhabitants, who trade in oil, wine, and sulphur. Numerous tombs, medals, and other antiquities have been found here.

NARRAGANSETTS, the remnants of a North American tribe of Indians. There are now only about 150 of them, living on a reservation at Charlestown, R. I. They are all half-breeds with only a few exceptions.

NARTHEX, a part of an early Christian church, which part was separated from the rest by a railing or screen, and to which the catechumens and penitents were admitted.

NARWHAL, a cetaceous animal inhabiting the Northern Ocean, and having a long tusk projecting from the fore part of the head; sea-unicorn; unicorn-whale; *Monodon monoceros*.

NASH, FRANCIS, an American general, born in Prince Edward county, Va., in 1720, died at Germantown, Pa., in 1777. In 1775 he was a member of the Provincial Congress and was by it appointed lieutenant-colonel in the Continental army. In February, 1777, he became brigadier-general, joined Gen. Washington, and commanded a brigade at Brandywine and Germantown, when he was mortally wounded.

NASH, JOHN, an English architect, born in London in 1752, died May 13, 1835. He is chiefly celebrated in connection with the great street improvements in London. From February, 1815, when he was appointed 'architect, valuer, an agent to the Board of Woods and Forests,' down till near the end of his professional career, he was busily engaged in the planning of routes, grouping of buildings, and fixing of sites. Regent Street, Haymarket Theatre, and the terraces in Regent's Park are specimens of his designs. The Pavilion at Brighton, about which he published a book, was another of his works. He retired from his profession in 1834.

Nash possessed great power of effective grouping. The architecture of mansion-houses and the designing of interiors was his forte.

NASHUA, a post-village of Chickasaw county, Ia., located in the midst of good farming land. It has excellent water-power and manufactures flour.

NASHUA, a manufacturing city of New Hampshire, forty miles northwest of Boston, at the junction of the Merrimac and Nashua rivers. Population in 1890, 19,311. See *Britannica*, Vol. XVII, p. 236.

NASHVILLE, a city, the county-seat of Washington county, Ill., in the southern part of the State about fifteen miles southeast of Kaskaskia river.

NASHVILLE, the capital of Tennessee, on the navigable Cumberland River, 200 miles above the Ohio, and 185 miles southwest of Louisville. Population in 1890, 76,309. See *Britannica*, Vol. XVII, p. 236.

NASMYTH, JAMES, the inventor of the steam-hammer, born in Edinburgh, Aug. 19, 1808, died May 7, 1890. At seventeen he constructed a small working steam-engine for grinding colors, and made five models of a condensing steam-engine, and later a small road locomotive. Employed in 1829 by Maudsley, he started in business at Manchester in 1834, and established at Patricroft what afterwards became known as the Bridgewater foundry. The invention of the steam-hammer was conceived in 1839, the occasion being the necessity for forging an enormous wrought-iron paddle shaft. But it did not take shape till 1842, when he found the steam-hammer as he had planned it at work at Creuzot in France. It had been adapted from his own scheme-book. Nasmyth patented his invention on his return to England, and it was adopted by the Admiralty in 1843. Among his other inventions was a steam pile-drive.

NAST, THOMAS, an American caricaturist, born at Landau, Bavaria, in 1840, and brought to this country by his father in 1846. When fourteen years old, he had about six months' instruction in drawing, and was then employed on "Frank Leslie's Illustrated Newspaper" as a draftsman. In 1860 he went to England as a special artist of this periodical. Thence he went to Italy, where he followed Garibaldi, making sketches for New York, London, and Paris illustrated papers. Returned to New York in 1861 he began to draw war sketches and political caricatures for "Harper's Weekly," which made him very popular. He has also illustrated several books, notably those of Petroleum V. Nasby, and for several years after 1872 he issued "Nast's Illustrated Almanac." As a pictorial satirist Nast is unsurpassed.

NASTRUM, the botanical name of the Water Cress, and the popular designation of the Indian Cress. See *Britannica*, Vol. XVII, p. 239; and Vol. XII, pp. 249, 285. The Indian Cress is characterized by a warm pungent taste and tonic stimulant, and antiscorbutic properties are ascribed to it. The flowers are employed as an ingredient in salads. The seeds when green are pickled in salt and vinegar and used as a substitute for capers. As an ornamental garden climber or creeper, the Indian Cress has long been known and admired.

NATAL, a South African colony of the British Empire. For general article on NATAL, see *Britannica*, Vol. XVII, pp. 239-242. Population in 1889, 530,158, composed as follows: Europeans, 37,390; Indians, 33,480; Kafirs, 459,288. Population in 1879, 361,587. Capital, Durban, with a population (in borough) of 22,882; population of Pietermaritzburg, 15,767.

The financial budget of 1889 reported a revenue of £1,327,105; and an expenditure of £1,146,079. The following are the principal items of ordinary revenue, 1889:—Railways, 458,698; customs, 369,460; excise, 23,471; land sales, 34,613; mails, 44,965; telegraphs, 29,270; stamps and licences, 28,412; native hut tax, 76,004.

The legislative council, under an act which received the royal assent in 1883, consisted of 30 members—increased in 1889 to 31 members, seven of whom are nominated by the crown, and the others are elected by voters qualified by the possession of immovable property of £50, or renting such property of the annual value of £10, or who (having resided three years in the district) have an income of £96 per annum, exclusive of allowances. The number of electors in 1889 was 8,834. The governor whose official supervision extends also over Zululand, receives a salary of £4,000.

NATATORES (Lat. "swimmers"), the name given by many ornithologists to the order of birds called Palmipedes by Cuvier.

NATCHEZ, a city, the county-seat of Adams county, Miss., on the east bank of the Mississippi River, 214 miles northwest of New Orleans. Population in 1890, 10,014. See *Britannica*, Vol. XVII, p. 242.

NATCHEZ INDIANS, now extinct, were a tribe of Indians living in the Mississippi valley at the time when the Spanish and French explorers came there. They were considered as the descendants of the "mound-builders," and lived under a chief called the Sun, whose power was completely despotic. They were annihilated by the French of Louisiana.

NATCHITOCHES, a city, the county-seat of Natchitoches parish, La., 450 miles northwest of New Orleans. Wagons, carts and plows are manufactured and the surrounding country produces corn, cotton, sugar-cane, rice, cattle and horses. The United States land office for the northern district of Louisiana is here, and the city contains a fine cathedral, two convents and a high-school.

NATIONALIST CLUB, an organization of recent formation, having its headquarters in Boston. It advocates: (1) The governmental control of all telegraphs, telephones and express companies; (2) The nationalization of all railroads; (3) The public ownership of all coal mines, oil and gas wells now in operation or hereafter discovered, and (4) The municipal control of all lighting, heating and street-car service, or such other town or city duties as are now discharged by private companies. Nationalists insist that children shall be given an education till the age of 17 years, and this education shall be compulsory. They propose that the present limit of the school age shall be raised, year by year, as rapidly as public sentiment will allow, and in cases of poverty partial State support shall be given to such children while attending school; child labor in factories and mines shall be absolutely prohibited by the most stringent laws.

NATIONAL GUARD, a French organization for local defense. Such a burgher guard has long existed in many French towns; it was introduced into Paris during the revolution, when the revolutionary leaders decreed the formation of a national guard for Paris of 48,000 citizens; and ere long there were 300,000 for the kingdom. In 1795 they were reorganized so as to exclude turbulent elements. They were defeated by Napoleon and the regular army, and practically ceased to exist. Militia organizations called national guards exist in several European countries and in some of the States of the United States.

NATIONAL LEAGUE, a league founded in 1882 in succession to the Land League, after the suppression of the latter by the British government. It is both a political and an agrarian organization, its main objects being the reform of the land laws, the weakening of the power of the landlords, the increase of peasant proprietors, and the creation of an independent or semi-independent government for Ireland, under the name of Home Rule. There are about 2,000 branches of the league scattered throughout Ireland, each with its president, secretary and treasurer. In America there is an organization of a similar character, and another in England. Scotland also has a league, principally composed of Irishmen, which advocates the principles of the parent institution north of the Tweed. See **PLAN OF CAMPAIGN**, in these Revisions and Additions.

NATIONAL PARTY, the Greenback-Labor Party of the United States. See **POLITICAL PARTIES**, in these Revisions and Additions.

NATIVE, a term much employed in mineralogy to designate substances found as minerals, which are also, and most of them more abundantly, obtained from other minerals by chemical processes. Thus silver found pure, or nearly so, is called *native silver*.

NATIVE AMERICAN PARTIES. Since the passage of our liberal naturalization and election laws, many native Americans had misgivings that in the not very distant future the alien-born citizens would control the political power in some of the States and large cities, most especially in the cities of New York and Philadelphia. The "Native American party" in 1840 was organized on the basis that only American-born citizens should hold offices of trust. In 1844 James Harper, senior member of the publishing house of Harper & Brothers of New York, was elected mayor of New York City on this platform, because many citizens who were desirous of reform voted for him without distinction of party. The success of the party, was, however, only local, when in 1852 the Whigs nominated General Winfield Scott, whose brilliant success as a commander in two wars was a part of the national glory, they were defeated by an overwhelming majority, in spite of strenuous efforts to draw the Irish vote.

At this time the Native American party organized itself anew, and as a secret order. Its members, when questioned about their party aims, would only confess "to know nothing." This gave the order the popular name of "Know Nothings." They kept their secret so well, that political leaders first became aware of what was going on, when, in 1855, this new and mysterious party had elected governors and legislatures in New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Kentucky, and California, and had elected a part of the State officers in Maryland and Texas. In 1856 the party was organized for a national canvass, and nominated Millard Fillmore for president. The fundamental principals of its platform were these: "America must be ruled by Americans only." "No person should be selected for political station who acknowledges allegiance or obligation to any foreign prince, potentate, or power." (This was aimed at the Catholics who acknowledged allegiance to the pope). "The law of naturalization must be so changed that the period of probation is extended to 21 years." But, although 1855 was the time when the Native American party reached the high-water mark of success in many of the States, yet in the national election of 1856, Mr. Fillmore received only 8 electoral votes and a popular vote of 874,534, while the newly-organized Republican

party received 114 electoral votes and a popular vote of 1,341,234. The latter party was therefore at once recognized as the only real competitor of the Democratic party for the possession of the government. After that election the Native American party vanished from the politics of the United States.

NATRON LAKES, eight lakes in a depression to the west of the Damietta branch of the Nile. The locality is renowned for the four monasteries, from whose libraries of Arabic, Coptic, and Syriac MSS. various European collections have been enriched. In the time of St. Pachomius 5,000 anchorites dwelt here.

NATUNA ISLANDS, densely wooded and mountainous islands, northwest of Borneo, Ranay, on Great Natuna, rising to a height of 3,500 feet. The largest of the islands has about 600 square miles. Population of the whole about 1,300, who grow rice, maize, sago, and cocoa-nuts, and exchange the produce of their fisheries, their sago and cocoa-nut oil, for rice, iron, and cottons, at the European settlements on the Strait of Malacca.

NATURAL, in music, a note belonging to the diatonic scale of C, and neither elevated by a sharp or depressed by a flat.

NATURAL GAS, a gas frequently found in the United States and mostly in the same regions where petroleum is found. Careful analysis, has shown it to be a true gas similar to the illuminating gas of our cities. Men skilled in the natural sciences now agree that both petroleum and natural gas are products of the decomposition of organic remains, vegetable or animal, and probably both, at a high temperature. Geologists generally agree that a great sea once covered the interior of our country, washing the base of the Apalachian mountain system on the east and the Rocky mountains on the west. This would naturally wash up accumulations of animal and vegetable remains along the shores, and these in the ages following would become buried far beneath the surface of the ground. Now, it is a fact that nine-tenths of all the petroleum, and practically all the natural gas, produced in this country are found in a narrow strip, about thirty miles in width, lying parallel with and about fifty miles west of the Allegheny Mountains, extending from New York State, through Ohio, Indiana, West Virginia, and Kentucky, into Tennessee. Not all of this soil is oil-producing country, but the productive spots are found in this belt. Now, if like products were found at the western shore-line of the supposed sea, the correctness of the theory would seem to be established. This condition is met in the oil, a fine lubricant, recently discovered in Wyoming. Those who have made the subject a careful study differ in opinion as to whether the processes of forming the products under discussion are still going on, or whether they belong to the remote past. The fact that some of the greatest wells of the region, producing millions of cubic feet daily, show no diminution from their output when first bored—from ten to twelve years ago—argues either immense stores of gas yet in the earth to keep up the pressure, or else a constant production.

It is now known that the greatest gas-producing wells are on or near the geological summits or anticlinals, while the best oil-wells are in the troughs between these. Both the gas and oil are found in a soft, porous rock, technically called "sand," and its depth varies from 1,000 to 3,000 feet below the surface of the ground. When gas is found it rushes at once to the outer air, as if glad to escape. In some of the greater gas wells the pressure is enormous. The drilling tools weigh more than a ton.

and in a number of instances these have been blown from the well many feet into the air by the gas in its first escape, while the roar of the outrushing gas could be heard for miles around. Such an escape, fired and burning at night, presents a grand spectacle, with its great sheet of ruddy flame leaping high in the air.

Natural gas has been used as a fuel in one Pittsburgh iron mill for about ten years, being piped from a well twenty miles distant, but it is less than one half of that time since its possibilities and advantages as a fuel have become generally apparent to the people of this hive of industry, and the greatest strides in its application have been made in the last three years. In that time many miles of pipe have been laid in the city and surrounding country, and the gas has been introduced into thousands of factories and homes. While some good producing wells are within the city of Pittsburgh, the greatest ones are located at a distance of about twenty miles. These are known as "gushers," or "roarers," and strangely enough, they are found on all sides of the city at about the distance above named. It seems as if nature had wisely located these great producing districts in a ring around the busy city, and at a safe distance from it. The surrounding country is laid with a network of nearly two thousand miles of pipes. The tubes vary from small ones up to mains twenty-four inches in diameter. There are mains sixteen inches in diameter, reaching from the wells to the city, each carrying the product of a number of wells. The business is chiefly in the hands of five great companies, having an aggregate capital of millions of dollars, but some great mills have their independent pipe lines.

It is estimated that there is a daily consumption of natural gas in the factories and dwellings in and about Pittsburgh to an amount displacing a coal consumption of about twenty-five thousand tons. The mere naming of the figures give but a faint idea of what this amounts to in reality. One of the leading causes of Pittsburgh's greatness as a manufacturing center was its abundant coal supply just at hand; but king coal has been supplanted. In manufacturing, the gas is used almost universally as a steam producer. It is also employed for the heating of the metals: iron, steel, brass, copper, etc., in the diverse branches of their utilization, and has been found in every respect superior to coal or coke for all the various operations of metal working except the first process, the smelting of the ore, in which coke continues to be employed. Its chief points of superiority over other fuels are its intense heating power, the ease with which it is handled, its freedom from sulphur and other substances deleterious to metals, its cheapness in first cost, its total lack of cinders, the accumulation of which is a serious matter to large establishments in populous localities, and the uniformity with which heat may be regulated by its employment. As compared with the best lump coal in heating quality, one thousand cubic feet of gas represents fifty-six pounds of coal, and the saving effected in first cost is about twenty per cent., besides the labor of handling and the transportation; as the terrific force with which, in the case of strong wells, it pours from the ground, forces it through the pipes without the necessity of any artificial pressure.

NATURALIZATION, the legal act by which an alien becomes a citizen of an adopted country. (See *ALIEN*, *Britannica*, Vol. I, pp. 574-6). Naturalization may be accomplished by annexing territory. Thus, when Louisiana was ceded to the United States by France in 1800, all its inhabitants became

citizens of the United States. When Florida was added to the union by treaty with Spain in 1819, all its inhabitants became United States citizens. When Texas was annexed by the joint resolution of March 1, 1845, its inhabitants became citizens of the United States. This is called "collective naturalization."

By far the greater part of the aliens who have become citizens of the United States have, however, become so under the naturalization laws passed by Congress. The basis of the present law is the act of April 14, 1802. The section relating to minors was passed in 1824, and the naturalization of persons of African descent was allowed by a law passed in 1870. The principal provisions now in force for the naturalization of aliens are contained in the following sections of the United States Revised Statutes:

SEC. 2165. An alien may be admitted to become a citizen of the United States in the following manner and not otherwise:

First.—He shall declare on oath, before a circuit or district court of the United States, or a district or supreme court of the Territories, or a court of record of any of the States having common law jurisdiction, and a seal and clerk, two years at least prior to his admission, that it is *bona fide* his intention to become a citizen of the United States, and to renounce forever all allegiance and fidelity to any foreign prince, potentate, state, or sovereignty, and, particularly, by name, to the prince, potentate, state, or sovereignty of which the alien may be at the time a citizen or subject.

Second.—He shall, at the time of his application to be admitted, declare, on oath, before some one of the courts above specified, that he supports the Constitution of the United States, and that he absolutely and entirely renounces and abjures all allegiance and fidelity to every foreign prince, potentate, state or sovereignty; and, particularly, by name, to the prince, potentate, state, or sovereignty of which he was before a citizen or subject; which proceedings shall be recorded by the clerk of the court.

Third.—It shall be made to appear to the satisfaction of the court admitting such alien that he has resided within the United States five years at least; and within the State or Territory where such court is at the time held, one year at least, and that during that time he has behaved as a man of a good moral character, attached to the principles of the Constitution of the United States, and well disposed to the good order and happiness of the same; but the oath of the applicant shall in no case be allowed to prove his residence.

Fourth.—In case the alien applying to be admitted to citizenship has borne any hereditary title, or been of any of the orders of nobility in the kingdom or state from which he came, he shall, in addition to the above requisites, make an express renunciation of his title or order of nobility in the court to which his application is made, and his renunciation shall be recorded in the court.

SEC. 2166. Any alien of the age of twenty-one years and upward, who has enlisted, or may enlist, in the armies of the United States, either the regular or the volunteer forces, and has been, or may be hereafter, honorably discharged, shall be admitted to become a citizen of the United States, upon his petition, without any previous declaration of his intention to become such; and he shall not be required to prove more than one year's residence within the United States, previous to his application to become such citizen; and the court admitting such alien shall, in addition to such proof of residence and good moral character, as now provided by law, be satisfied by competent proof of such persons having been honorably discharged from the service of the United States.

SEC. 2167. Any alien, being under the age of twenty-one years, who has resided in the United States three years next preceding his arriving at that age, and who has continued to reside therein to the time he may make application to be admitted a citizen thereof, may, after he arrives at the age of twenty-one years, and after he has resided five years within the United States, including the three years of his minority, be admitted a citizen of the United States, without having made the declaration required in the first condition of section 2165; but such alien shall make the declaration required therein at the time of his admission; and shall further declare, on oath, and prove to the satisfaction of the court, that, for two years next preceding, it has been his *bona fide* intention to become a citizen of the United States; and he shall in all other respects comply with the laws in regard to naturalization.

SEC. 2169. The provisions of this title shall apply to aliens being free white persons, and to aliens of African nativity, and to persons of African descent.

SEC. 2170. No alien shall be admitted to become a citizen who has not for the continued term of five years next preceding his admission resided within the United States. The naturalization of aliens is not commonly performed by State courts, although they become citizens of the United

States. In some portions of the States the naturalized citizens are more numerous than the native-born ones, and they control the local elections in such places.

NATURE-PRINTING, a process by which engravings or plates answering thereto are produced by taking impressions of the objects themselves and printing from them, invented or improved about 1853 by Alois Auer of Vienna. Suitable objects, such as dried and pressed plants, embroidery and lace, are placed between a plate of copper and one of lead, both worked smooth and polished; the plates are drawn through a pair of rollers, under pressure; then, when the plates are separated, it is found that a more or less perfect impression of the object has been made in the leaden plate. This may be used directly as an engraved plate, if only a few impressions are wanted; or a fac-simile of it may be obtained in copper by the electrolyte process.

NAUCRATIS, an ancient city of Egypt, situated in the Nile delta, near the modern village of Nebireh, 47 miles southeast of Alexandria. It existed in the 7th century B. C., and was the only city in Egypt at which the Greeks were allowed to trade. It was celebrated for its artistic pottery; and was a center for the worship of Aphrodite. The site was discovered by Flinders Petrie in 1884, and excavated by him in that and the following year. His monograph *Naukratis* gives an account of the ruined temples and the many valuable archaeological discoveries made on this site.

NAUGATUCK, a village of New Haven county, Conn., on the Naugatuck River, 22 miles northwest of New Haven. It contains the factory of the Goodyear Glove & Rubber Company, and also manufactories of cutlery and ironware. Population in 1890, 6,218.

NAUMANN, EMIL, a German musician, born at Berlin in 1873. He studied music under Mendelssohn. In 1877 he was made professor of the history and theory of music at Dresden. Among his musical works are an oratorio entitled *Christus, der Friedensbote*, which was performed at Dresden in 1848; a *Grand Mass*, performed at Berlin in 1852; and two operas, *Judith und Mühlenhexe*. He has written *Tonkunst in der Kulturgeschichte* (1869); *Italienische Tondichter*; *Deutsche Tondichter*; *Zukunftsmusik und die Musik der Zukunft*, and *Architektonik der Fuge* (1878).

NAUMANN, JOHANN FRIEDRICH, a German ornithologist, born at Ziebigk, near Köthen, in 1780, died at Köthen in 1857. After being educated at Dessau he devoted himself to natural science. The duke of Anhalt-Köthen made him keeper of the ornithological museum. His chief work is *Naturgeschichte der Vögel Deutschlands* (2 vols.), which is a standard work on the ornithology of Germany.

NAUMANN, KARL FRIEDRICH, a German mineralogist, born at Dresden in 1797, died there in 1873. After studying geology at Freiberg, Leipzig and Jena, he became professor at Jena in 1823 and at Freiberg in 1826. In 1842 he was called to the chair of geognosy at Leipzig. Among his published works are *Lehrbuch der Mineralogie*; *Lehrbuch der reinen und angewandten Krystallographie*; *Elemente der Mineralogie*, and *Lehrbuch der Geognosie*.

NAUSEA, a distressing sensation always referred to the stomach. It is unattended by pain, but is usually accompanied by a feeling of general languor or debility, a small and often irregular pulse, a pale, cool and moist skin, general muscular relaxation, an increased flow of saliva and a sensation that vomiting will supervene. It is most commonly a direct symptom of disease or disorder of the stomach, but sometimes it is a very important indirect symptom of disease of some part at a dis-

tance from the stomach—as, for example, the brain or the kidney.

NAUTILUS PROPELLER, a vessel propelled by the expulsion backward of a current of water driven through a cylinder by an enclosed turbine-wheel.

NAUTCH GIRLS, public female dancers in India and the East Indies. Their performances constitute a principal part in the spectacular entertainment called a nautch.

NAVAJO INDIANS, a tribe of North American Indians. See **INDIANS**, **NORTH AMERICAN**, in these Revisions and Additions.

NAVAL, BERNHARD HENRY, an American clergyman, born in Talbot county, Md., in 1812, died at Madison, N. J., in 1870. He joined the Baltimore Methodist Episcopal Conference in 1835, and labored in Maryland, Virginia, Pennsylvania, Brooklyn, N. Y., and New Haven, Conn. From 1854 to 1857 he was professor in Indiana Ashbury University. He afterwards had charge of churches in New York and other cities; and was for one session chaplain of the United States House of Representatives. On the organization of the Drew Theological Seminary he was made professor of church history there, and in 1870 he became the acting president of that school. He was a strong opponent of slavery and exerted much influence in favor of the Union cause during the civil war.

NAVAL ACADEMY, UNITED STATES. This school has been opened in October, 1845, with Commander Franklin Buchanan as superintendent. It is located at Annapolis, Md. When the bureau of navigation was established in 1862 the naval academy was placed under the supervision of this bureau. But March 1, 1867, it was placed under the direct supervision of the Navy Department. The term of the academic course was by a law of 1873 made to be six years, and by an act of 1874 the course of instruction for cadet engineers was made four years.

An act of Congress, approved Aug. 5, 1882, provides that from that date "there shall be no more appointments of cadet-midshipmen or cadet-engineers at the Naval Academy, but in lieu thereof naval cadets shall be appointed from each Congressional district and at large as now provided by law for cadet-midshipmen, and all the under-graduates at the Naval Academy shall thereafter be designated and called naval cadets, and from those who successfully complete the six years' course appointments thereafter shall be made."

CLASSIFIED LISTS OF NAVAL VESSELS OF THE UNITED STATES.

Showing the names of the vessels, date of construction, burthen, speed and cost:

Vessels.	Type.	Keel laid.	Displacement.	Maximum horse power.	Speed in knots per hour.	Cost of Hull and Machinery.
Armored.		Tons.				
Puritan	Barbette coast defense.	1875	6,060	3,700	12.4	}
Miantonomoh	Double turret.	1874	3,990	1,426	10.5	
Amphitrite	Barbette coast defense.	1874	3,990	1,600	12.	
Monadnock	"	1874	3,990	3,000	14.5	
Terror	Double turret.	1874	3,990	1,600	12.	

* Appropriated to complete \$3,178,046.

1114 NAVAL OBSERVATORY—NAVAL RESERVE

Vessels.	Type.	Keel laid.	Displacement.	Maximum horse power.	Speed in knots per hour.	Cost of Hull and Machinery.
			Tons.			
Armored.						
Texas.....	Armored battle ship.	1889	3,300	8,600	17.	\$2,500,000
Maine.....	Armored cruiser.	1889	6,648	9,000	17.	2,500,000
Monterey.....	Barbette coast defense.	1889	4,048	5,400	16.	1,628,950
New York.....	Armored steel cruiser.	1890	8,150	16,500	20.	2,985,000
Indiana.....	Belted cruiser.	1891	10,200	9,000	15.	3,020,000
Massachusetts.....	"	1891	10,200	9,000	15.	3,020,000
Oregon.....	"	1891	10,200	9,000	15.	3,180,000
Monitors.						
Ajax.....	Single turret.	1862	2,100	340	5 to 6	626,582
Comanche.....	"	1862	1,875	340	5 to 6	613,164
Canonicus.....	"	1862	2,100	340	6	622,963
Catskill.....	"	1862	1,875	340	6	427,796
Jason.....	"	1862	1,875	340	5 to 6	427,796
Lehigh.....	"	1862	1,875	340	5 to 6	427,796
Mahopac.....	"	1862	3,100	340	6	635,571
Manhattan.....	"	1862	2,100	340	6	628,879
Montauk.....	"	1862	1,875	340	5 to 6	428,027
Nahant.....	"	1862	1,875	340	5 to 6	413,515
Nantucket.....	"	1862	1,875	340	5 to 7	408,091
Passaic.....	"	1862	1,865	340	5 to 6	423,171
Wyandotte.....	"	1862	2,100	340	6	633,327
Unarmored.						
Chicago.....	Protected cruiser.	1883	4,500	5,084	14.0	889,000
Boston.....	"	1883	3,189	4,000	15.6	619,000
Atlanta.....	"	1883	3,189	4,000	15.6	617,000
Dolphin.....	Dispatch boat.	1883	1,485	2,240	15.5	315,000
Newark.....	Protected cruiser.	1887	4,083	8,500	18.0	1,248,000
Charleston.....	"	1887	4,400	6,666	18.205	1,017,000
Baltimore.....	"	1887	4,640	10,064	19.575	1,325,000
San Francisco.....	"	1888	4,083	10,400	20.17	1,428,000
Philadelphia.....	"	1888	4,324	8,615	19.578	1,350,000
No. Six.....	"	1890	5,500	13,500	20.0	1,796,000
Cincinnati.....	"	1890	3,183	10,000	19.0	1,100,000
Raleigh.....	"	1889	3,183	10,000	19.0	1,100,000
No. Nine.....	Cruiser.	1890	2,000	5,400	17.0	612,500
No. Ten.....	"	1890	2,000	5,400	17.0	612,500
No. Eleven.....	"	1891	2,000	5,400	17.0	612,500
No. Twelve.....	Protected.	1891	7,400	21,000	21.0	2,725,000
Gun Boats.						
Yorktown.....	Gun Boat.	1887	1,700	3,660	16.55	455,000
Concord.....	"	1888	1,700	3,400	16.	490,000
Bennington.....	"	1888	1,700	3,400	16.	490,000
Petrel.....	"	1887	890	1,045	11.55	247,000
No. 5.....	"	1891	1,050	1,000	14.	318,000
No. 6.....	"	1891	1,050	1,600	14.	318,000
Special Class.						
Prac. Cruiser.	Cruiser.	1891	838	1,300	13.	250,000
Vesuvius.....	Dynamite.	1887	725	3,794	21.5	350,000
Torpedo Boats.						
Stiletto.....	Torpedo boat.	1886	31	359	18.22	25,000
Cushing.....	Torpedo boat.	1889	116	1,720	22.50	82,750

There are in addition to the above, 60 other vessels on the United States naval list. The iron steam vessels number 7, bearing names as follows: Ranger, Alert, Monocacy, Michigan, Palos, Pinta and Alarm, the last now fitting at the Brooklyn yard as gunnery ship for training squadron. There are 18 wooden steam vessels in active service, viz: Lancaster, Pensacola, Richmond, Omaha, Swatara, Galena, Marion, Mohican, Iroquois, Kearsarge, Adams, Alliance, Essex, Enterprise, Nipsic, Tallapoosa, Yantic and Despatch. There are 6 wooden sailing vessels, viz: Constellation, Monongahela,

Portsmouth, Jamestown, Saratoga and St. Mary's, all used as training or school ships. There are 14 iron and wooden steam tugs, viz: Catalpa, Cohasset, Fortune, Leyden, Mayflower, Monterey, Nina, Rocket, Standish, Triana, Triton, and three others now under construction. There are 15 vessels unfit for sea service; 4, Intrepid, Saugus, Speedwell and Rescue, iron, have been condemned and abandoned; 3, Brooklyn, Hartford and Ossipee, wooden, are condemned, and 8, Wabash, Franklin, Minnesota, Constitution, Independence, Vermont, St. Louis and Dale, wooden, are used as receiving ships.

NAVAL OBSERVATORY at Washington. United States Naval Secretary Tracy, in his report to Congress Dec., 1891, recommended a radical change in the supervision of this observatory, as follows: "The system in existence hitherto, by which the selection of the superintendent has been confined to line officers of the navy, subject like other officers to changes of duty at comparatively short intervals, prevents that continuity of administration which is essential in carrying on the work of a great national observatory. No programme of scientific investigation, especially in the department of astronomy, can be carried out successfully by any institution if liable to frequent interruptions by a change of its administrative head. I therefore recommend the adoption of legislation which shall enable the President to appoint, at a sufficient salary, without restriction, from persons either within or outside of the naval service, the ablest and most accomplished astronomer who can be found for the position of superintendent. I would also recommend, in view of the era of progress and scientific development upon which the observatory is now entering, that an advisory council be organized, composed of the superintendent of the observatory and its senior professor and of three other persons of scientific attainments, whose duty it shall be to consider and report upon new instruments and their proper installation, to draw up, with such changes as may be necessary, from time to time the programme of scientific work, including observation, reduction and publication, and to make such inspections and reports as may be desirable in regard to the character of the work done by the observatory."

This recommendation of Secretary Tracy was endorsed by twenty directors of astronomical observatories throughout the country. A few years ago Congress authorized the purchase of a new site and the erection of new buildings, which have been completed and liberally equipped at an expense exceeding that of any similar establishment in the world.

NAVAL ORDNANCE. The United States Congress in its naval appropriations in 1890-91 provided for the supply of 100 high-power guns for its fortification. The call was for 25 eight-inch, 50 ten-inch, and 25 twelve-inch breech-loading steel rifles; the maximum cost to be \$4,250,000. In the discussions incident to the legislative appropriation the hope was expressed that the succeeding Congress (52nd) would call for the construction of an additional 100 guns for the same purpose.

NAVAL RESERVE, ROYAL, a sort of militia auxiliary to the British navy. It is a force held in high esteem by naval men, and is considered an extremely valuable reserve of trained men ready to man the fleet in case of emergency. The act under which the force was instituted in 1859 authorizes the engagement of 30,000 men, each for a period of five years, and provides that each shall be trained for twenty-eight days in every year to the use of

arms and in naval gunnery, either in ships of the navy or on shore. In case of national emergency, these men can, by royal proclamation, be called out for service in the navy in any part of the world. In 1889 the total number of reserve men drilled was 18,869, of which number 8,294 were receiving an extra penny a day as trained men. The officers of all ranks now number 553 and the men 19,851.

NAVARETE, MARTINO, FERNANDEZ DE, Spanish historian, born at Abalos, Spain, in 1765, died at Madrid in 1844. He fought in the Spanish navy against the Barbary pirates and against the French in the Mediterranean. Afterwards he made extensive investigations of Spanish discoveries in the fifteenth century, and published the results. After his death appeared his treatise on the *History of Spanish Navigation* (1846), and the *Spanish Maritime Library* (1851).

NAVASOTA, a post-village and a railroad junction of Grimes county, Texas, seventy miles north of Houston. It has good educational institutions, and manufactures cotton, flour, cotton-seed oil, carriages, and wagons.

NAVASSA, an island in the West Indian group. This island, under the provisions of Title 72 of the Revised Statutes, has been recognized as appertaining to the United States. It contains guano deposits, is owned by the Navassa Phosphate Company, and occupied solely by its employees. In September, 1889, a revolt took place among these laborers, resulting in the killing of some of the agents of the company, caused, as the laborers claimed, by cruel treatment. These men were arrested and tried in the United States court at Baltimore, under Section 5,576 of the statute referred to, as if the offenses had been committed on board a merchant vessel of the United States on the high seas. There appeared on the trial such evidence of the bad treatment of the men that, in consideration of this and of the fact that the men had no access to any public officer or tribunal for protection or the redress of their wrongs, President Harrison commuted the death sentences passed by the court against three of them; and the President in his message of December, 1891, strongly recommended such legislation by Congress as shall place labor contracts upon this and other islands having a similar relation to the United States, under the supervision of a United States Court Commissioner for protection and the redress of wrongs.

NAVEW, a garden vegetable much cultivated in France and other parts of the continent of Europe. The part used is the swollen root.

NAVIGATION, See Britannica, Vol. XVII, pp. 250-277.

NAVIGATION, INLAND, OF THE UNITED STATES. From the northwest to the seaboard there is a continuous water route by way of Lakes Superior, Michigan, Huron, Erie, the Erie Canal and the Hudson River to New York. By connecting the Wisconsin river, which flows into the Mississippi at Prairie du Chien, with the Fox River, which empties into Green Bay, an arm of Lake Michigan, continuous water-communication was established between the Great Lakes and the Mississippi River. The canal connecting the two water systems is at Por-

tage, Wis. It was built by order and at the expense of the United States Government. The canal proper is only two miles in length. From any point along the Mississippi River and its navigable affluents grain and other produce may by this route be shipped to Chicago and New York without breaking bulk.

The principal canals in the United States are the following:

Canals.	Length Miles.	Width Feet.
Illinois and Michigan Canal: Chicago to La Salle.....	102	60
Ohio Canal and feeders: Cleveland and Portsmouth.....	323	40
Miami and Erie feeders: Cincinnati and Toledo.....	284	50
Erie Branch and feeders: Albany to Buffalo.....	365	70
Oswego Canal: Syracuse to Oswego.....	18	70
Champlain feeder: Whitehall to Waterford.....	81	58
Delaware and Hudson Canal: Honesdale, Pa., to Rondout, N. Y.....	108	48
Chesapeake and Delaware: Delaware City to Chesapeake City.....	14	66
Aiken and Chesapeake: Norfolk to Currituck.....	14	80
Bismal swamp: Elizabeth River and Pasquotank.....	28	60
Ogeechee Canal: Savannah River to Ogeechee River.....	16	120
Santa Fe Canal, Florida: Waldo and Melrose, Florida.....	101	35
New Orleans to Pontchartrain.....	62	85
Orleans Bank Canal.....	62	85
Galveston and Brazos.....	8	50

LAKE HARBORS.—We append here an enumeration of the principal harbors on the Great Lakes:

Duluth, Minn., has a dredged basin, 16 feet deep of an area about a half square mile. Grand Marais, Minn., has a similar basin protected by a breakwater. Ontonagon Harbor, Mich., is shallow at the mouth of the river. But piers have been built from the shore into the lake and the bottom between these piers has been dredged until a depth of 12 feet was secured. Octon, Wis., lies on Green Bay. Its harbor has also been deepened by dredging between two piers. Green Bay Harbor has a dredged channel 14 feet deep to the deep water of Green Bay. Sturgeon Bay, Wis., has a harbor of refuge between two piers $\frac{1}{2}$ mile in length. Its channel is 16 feet deep. Sheboygan Harbor, Wis., is approached by a channel from 14 to 18 feet deep. Milwaukee Bay, Wis., has an artificial harbor of refuge formed by inclosing a portion of Lake Michigan within an outlet breakwater of cribwork. Milwaukee Harbor has a channel 18 feet deep between two piers. Racine Harbor, Wis., has a dredged channel 13 feet deep between piers.

Chicago has an outer-harbor adjoining the Chicago River of a depth of 16 feet, and a harbor of refuge, which affords good anchorage in deep water and safe access to the river and harbor. Calumet Harbor has a dredged channel 300 feet wide and 16 feet deep from Lake Michigan to the Calumet River. Michigan City has an outer and an inner harbor. The inner harbor has been deepened at shoal points to 17 feet, and the heaviest vessels can now pass to any part of it. The Harbor of Cheboygan, Mich., has a depth of 15 feet in the basin opposite the steamboat landing, and a 15-foot channel to the Strait of Mackinac. The width is only from 90 to 100 feet in some parts.

The harbor of refuge at Belle River, Mich., has a channel 50 feet wide and 12 to 13 feet deep. It affords a safe refuge against running ice. Monroe Harbor, Mich., has a channel 10 feet deep between the Raisin River and Lake Erie, the entrance into the lake being protected by piers. Toledo Harbor is approached by a channel dredged through Maumee Bay. It is from 15 to 17 feet deep at low water. Sandusky City Harbor has a channel 150 feet wide and 14 feet deep, by which it is approached through the outer bar. Huron Harbor is approached be-

tween parallel lines of piers running out into Lake Erie. They give a wide entrance of at least 14 feet depth.

Cleveland harbor has now a good, wide channel, where the Cuyahoga river empties into Lake Erie, with a depth of from 17 to 20 feet between the railroad bridge and the lake. Fairport Harbor, at the mouth of the Grand River, is approached between parallel piers 200 feet apart, leaving a channel 16 feet deep between them. Ashtabula is approached in a similar way. Erie Harbor has a channel of 16 feet depth from the lake to the harbor. Dunkirk Harbor has been formed by a breakwater nearly parallel to the shore. The channel is 13 feet deep between ragged rocks on either side. Buffalo Harbor is made by a breakwater of cribwork $1\frac{1}{4}$ miles long running parallel with the shore, and a line of pile and cribwork $\frac{3}{4}$ mile long running out toward the southern end of the main breakwater. They leave an open space of about 150 feet width between themselves.

Charlotte Harbor, N. Y., has a channel of 15 feet depth into Lake Ontario. It is the harbor for the city of Rochester, N. Y. Great Lodus has a harbor formed of two breakwaters meeting at an angle. From the opening parallel piers extend into the lake, the channel between them having now a depth of 10 feet. Oswego Harbor, N. Y., is made by two breakwaters, one a mile in length, and the other half a mile. The mouth of the Oswego River has been deepened to 15 feet. Sackett's Harbor, N. Y., was formed by dredging an area of 15 acres to a depth of 12 feet. Ogdensburg Harbor, N. Y., was made by deepening the channel along the St. Lawrence River front to 12 and 14 feet, and dredging a channel 15 feet deep which leads to the deep water of the St. Lawrence.

NEAGLE, JOHN, an American portrait-painter, born at Boston, Mass., in 1799, died at Philadelphia, Pa., in 1865. He received only three months' instruction from Peter Ancora, a drawing teacher. He was apprenticed to a coach-painter in Philadelphia; but in 1818 he determined to devote himself to portrait-painting. In 1826 he painted the celebrated full-size portrait of *Patrick Lyon, the Blacksmith*, at his forge, which is now in the Pennsylvania academy of fine arts at Philadelphia. Among his most notable portraits are *Washington*, *Henry Clay*, *Matthew Carey*, *Dr. Th. Parker*, *Gilbert Stuart*, *Bishop Meade*, of Virginia, and *Judge Sharswood*. As a painter he was a powerful colorist, a skillful delineator of character, and a vigorous draftsman.

NEAL, DAVID DOLOFF, an American figure-painter, born at Lowell, Mass., in 1837. In 1862 he went to Munich, where he studied under Aimmüller, and afterwards under Piloty. Among his earlier works are *Chapel of the Nonberg Convent, Salzburg* (1864); *Chapel of the Kings at Westminster*; *The Interior of St. Marks, Venice*; and *On the Canal, Venice*. His best known work is *The First Meeting of Queen Mary Stuart and Riccio*. When it was exhibited in 1876, it was awarded the grand medal of the Bavarian Academy. Among his other pictures are *Retour du Chasse*; *James Watt*; *The Burgomaster*; and *Oliver Cromwell visits John Milton* (1883). He lives mostly at Munich, but has also exhibited in London and New York City.

NEAL, JOHN, an American author, born in Maine, Aug. 25, 1793, died June 21, 1876. In his youth he was a Quaker, and he began the world at twelve as a shop-boy. In 1816 he failed in business, and turned to the study of law, supporting himself the while by his pen. He was one of the first Americans to write in the greater English magazines, and from 1823 till 1827 he lived in England, part of

the time as one of Bentham's students and secretaries. After his return to America he settled in his native town, practiced law, edited newspapers, lectured, and found relaxation in practicing and teaching boxing, fencing, and gymnastics. Among his numerous works are a series of novels, *Bentham's Morals and Legislation*, and *Wandering Recollections of a Somewhat Busy Life*.

NEAL, JOSEPH CLAY, an American humorist, born at Greenland, N. H., in 1807, died at Philadelphia, Pa., in 1847. From 1831 to 1842 he edited the "Pennsylvanian," a Philadelphia newspaper. In order to restore his failing health, he went to Europe in 1842. After his return he established "Neal's Saturday Gazette," which abounded in humorous satire and proved remarkably successful. In 1846 he married Miss Alice Bradley. His character sketches show much genial humor. Under the title "City Worthies" he described a number of small spendthrifts, pretenders to fashion, town loafers, and idle bores. These descriptions were collected in book form and published as *Neal's Charcoal Sketches*, and *Peter Ploddy and other Oddities* (1844).

NEANDERTHAL, a wildly romantic valley between Düsseldorf and Elberfeld in Rhenish Prussia. In a limestone cave in this valley was found in 1857 the skeleton of a prehistoric man, and the peculiar formation of the skull induced several archaeologists to regard it as typical of a separate race of ancient cave-dwellers. Other authorities explain the abnormality as caused by disease during the lifetime of the individual.

NEAT CATTLE, cattle of the bovine genus, as bulls, oxen, cows and calves.

NEB-NEB, or NIB-NIB, the dried pods of *Acacia Nilotica*, a native of Africa, and one of the species of *Acacia* which yield gum-arabic. These pods are much used in Egypt for tanning.

NEBRASKA CITY, the county-seat of Otoe county, Neb., on the west bank of the Missouri River, seventy-four miles below Omaha. It contains the Nebraska College, the Academy of the Annunciation, and a number of mills and factories. Population in 1890, 11,472.

NEBRASKA, STATE OF. For general article on the STATE OF NEBRASKA, see *Britannica*, Vol. XVII, pp. 306-309. The census of 1890 reports the area and population as follows: Area, 77,510 square miles; population, 1,058,910, a gain during the decade of 604,391, or 133.60 per cent. Capital, Lincoln, with a population of 55,151.

The full list of governors of the territory and State of Nebraska is as follows:

TERRITORY.

Francis Burt.....	1854	J. Sterling Morton.....	1858-59
T. B. Cuming.....	1854-55	Samuel W. Black.....	1859-61
Mark W. Izard.....	1855-58	Alvin Saunders.....	1861-66
William A. Richardson.....	1858	David Butler.....	1866-67

STATE.

David Butler.....	1867-71	Albinus Vance.....	1879-83
William H. James.....	1871-73	James W. Dawes.....	1883-87
Robert W. Furnas.....	1873-75	John M. Thayer.....	1887-91
Silas Garber.....	1875-79	James E. Boyd.....	1891-93

Governor Boyd's official term expires Jan. 6, 1893. The salary of the governor is \$2,500.

BRIEF HISTORIC OUTLINE.—Nebraska was a part of the Louisiana cession from France to the United States in 1803. It was visited by Lewis and Clarke in 1804-5. It formed a part of Missouri in 1812. Nebraska Territory was organized in 1854, and then included part of Colorado, Dakota and Montana, and most of Wyoming. In 1861 and 1863 the territory was made much smaller by setting off Dakota, Colorado, Wyoming and Montana territories. Ne-

braska was admitted as a State into the Union March 1, 1867. The Constitution was revised in 1876. The Union Pacific Railroad was opened through Nebraska.

Progress of population of Nebraska by decades: In 1860, 28,841; 1870, 122,993; 1880, 452,402; 1890, 1,053,910.

For numerous other items of interest relating to the State of Nebraska, see article UNITED STATES, in these Revisions and Additions.

The following gives the population of the cities of over 8,000 inhabitants each in the State, in 1890, together with the increase during the decade:

Cities and Towns.	Population, 1890.	Increase.	Per cent.
Beatrice.....	13,823	11,389	465.43
Hastings.....	15,585	10,767	382.22
Kearney.....	8,074	6,392	353.09
Lincoln.....	55,154	41,151	324.16
Nebraska City.....	11,494	7,311	174.73
Omaha.....	140,452	109,994	360.23
Plattsmouth.....	8,392	4,217	101.01
South Omaha.....	8,062		

Grand Island returned a population of 7,632; Fremont, 6,654, and Columbus, 3,118.

The land areas in square miles and the populations, severally, of the counties of the State in 1890 and 1880 were as follows:

Counties.	Area.	Population.	
		1890.	1880.
Adams.....	552	24,203	10,235
Antelope.....	964	10,399	3,953
Arthur.....	720	91	
Banner.....	756	2,435	
Blackbird.....	720		109
Blaine.....		1,146	
Boone.....	692	8,083	4,170
Box Butte.....	1,080	5,494	
Brown.....	1,020	4,359	
Buffalo.....	882	22,162	7,531
Burt.....	465	11,069	6,937
Butler.....	593	15,454	9,194
Cass.....	530	24,080	16,683
Cedar.....	735	7,028	2,899
Chase.....	888	4,807	70
Cherry.....	5,668	6,428	
Cheyenne.....	3,288	5,693	1,558
Clay.....	576	16,310	11,294
Colfax.....	400	10,453	6,588
Cuming.....	576	12,265	5,596
Custer.....	2,592	21,677	2,211
Dakota.....	280	5,386	3,213
Dawes.....	1,404	9,722	
Dawson.....	1,028	10,129	2,909
Deuel.....	2,130	2,893	
Dixon.....	468	8,094	4,177
Dodge.....	520	19,250	11,263
Douglas.....	330	158,008	37,645
Dundy.....	912	4,012	37
Fillmore.....	576	16,032	10,204
Franklin.....	579	7,693	5,465
Frontier.....	973	8,497	934
Furnas.....	720	9,840	6,407
Gage.....	864	36,344	13,164
Garfield.....	576	1,659	
Gosper.....	468	4,816	1,673
Grant.....	720	458	
Greely.....	576	4,869	1,461
Hall.....	562	16,513	8,572
Hamilton.....	576	14,096	8,207

Counties.	Area.	Population.	
		1890.	1880.
Harlan.....	576	8,158	6,086
Hayes.....	720	3,953	119
Hitchcock.....	720	3,799	1,012
Holt.....	2,714	13,672	3,287
Hooker.....	720	426	
Howard.....	576	6,430	4,391
Jefferson.....	576	14,850	8,096
Johnson.....	396	10,333	7,595
Kearney.....	525	9,061	4,072
Keith.....	1,254	2,556	394
Keya Paha.....	665	3,920	
Kimball.....	928	959	
Knox.....	6,100	8,582	3,666
Lancaster.....	864	76,395	23,090
Lincoln.....	2,580	10,441	3,632
Logan.....	576	1,378	
Loup.....	576	1,662	
McPherson.....	630	401	
Madison.....	576	13,669	5,589
Merrick.....	440	8,788	5,341
Nance.....	436	5,743	1,212
Nemaha.....	391	12,930	10,451
Nuckolls.....	576	11,417	4,235
Otoe.....	608	25,403	15,727
Pawnee.....	432	10,940	6,920
Perkins.....	882	4,364	
Phelps.....	576	9,869	2,447
Pierce.....	576	4,864	1,202
Platte.....	682	15,437	9,511
Polk.....	439	10,817	6,846
Red Willow.....	730	8,837	3,044
Richardson.....	545	17,574	15,031
Rock.....	856	3,083	
Saline.....	576	20,097	14,491
Sarpy.....	280	6,875	4,481
Saunders.....	740	21,577	15,810
Scott's Bluff.....	756	1,888	
Seward.....	576	16,140	11,147
Sheridan.....	2,180	8,687	
Sherman.....	576	6,399	2,061
Sioux.....	2,046	2,452	699
Stanton.....	432	4,619	1,813
Thayer.....	576	12,738	6,113
Thomas.....	720	517	
Thurston.....	398	3,176	
Valley.....	572	7,092	2,324
Washington.....	381	11,869	8,631
Wayne.....	444	6,169	813
Webster.....	576	11,210	7,104
Wheeler.....	576	1,683	644
York.....	576	17,279	11,170
Unorganized territory.....	655	686	2,913

NECEDAH, a town of Juneau county, Wis., about five miles west of the Wisconsin River.

NECHES RIVER rises in eastern Texas, and flows about 350 miles southeast to Sabine Lake, its waters passing thence by Sabine Pass into the Gulf of Mexico.

NECROPHILISM, an unnatural and revolting love or appetite for the dead which has manifested itself in various ways. Consorting or living with the dead has been observed as a characteristic of melancholia. Individuals have inhabited graveyards, preferring the proximity and association of corpses with which they had no tie, to the cheerfulness and comforts of home. The most extraordinary exhibition of necrophilism is where individuals have exhumed corpses, to see them, to kiss them, to carry them away to their own homes, or to mutilate and tear them to pieces.

NECROPOLIS, a Greek term, meaning "the city of the dead," and applied to the cemeteries in the vicinity of ancient cities. It occurs in classical an-

tiquity only as applied to a suburb of Alexandria, lying to the west of that city, where the corpses were received and embalmed. Here Cleopatra applied the asp to her breast.

NECTARY, in botany, an organ in the flowers of many phanerogamous plants, devoted either to the secretion or the reception of the honey.

NEEDLES, see Britannica, Vol. XVII, pp. 313-14. Needles are now made of many different sizes and shapes, and applied to many different uses. The needle trade has become an important one, although less so in America than in Europe. In the tenth census forty establishments were counted in America, where pins and needles are made. Their total product was valued at \$1,378,000 for 1880. In manufacturing them each needle has to pass through about fifty pairs of hands before it is finished and ready for the market.

NE EXEAT REGNO, the title of a writ issued by a superior court to prevent an individual leaving the country, unless he gives security to abide a decree of the court.

NEFF, FELIX, a Protestant pastor, born at Geneva, in 1798, died in 1829. In his twenty-sixth year he was ordained, in England, to minister to the neglected inhabitants of the lofty Alpine valleys in the east of the department of Hautes Alpes. His parish was a most difficult one to minister to, owing to its mountainous nature and great extent, and the uncivilized character of the people. But with unwearied devotion and simple piety Neff labored amongst them like his chosen model, Oberlin, until his death.

NEGAUNEE, a manufacturing and mining city of Michigan, situated on a high ridge about twelve miles west of Marquette. The output of iron is sometimes 200,000 tons in one year. Nitro-glycerine, mining-powder and charcoal are manufactured, and the local trade is very large. Population in 1890, 6,061.

NEGLECTANCE, the omission to take such precautions as a careful and circumspect man would take. It implies civil or criminal liability, if by this omission damage or bodily harm is caused to a third party. If a person is killed in direct consequence of another's negligence, this killing constitutes manslaughter. In suits for negligence the jury has usually to decide the point of fact, whether there has been negligence on the part of the defendant, or the mischief has been done by accident, that is, the concurrence of peculiar circumstances of which the defendant's omission is not the proximate cause. In civil suits the burden of proof is upon the plaintiff. If he can establish a legal presumption of negligence, he is entitled to recover, unless the defendant produces evidence sufficient to rebut that presumption.

A master is liable for the negligence of his servants, if they perform acts ordered by him and in the way he directs them to do such acts. But he is not responsible for any of their doings outside of the general business in which they serve him. If one servant is placed in command of another servant and the latter is injured by the negligence of the former, the courts in the United States hold that the master is liable for such injury. But he is not liable for injuries received by a servant from a fellow-servant if the latter is not placed over the former by his master. See Britannica, Vol. XVIII, pp. 315, 316.

NEGRI SAMBILAN ("Nine States"), a confederacy of small states in the interior of the Malay Peninsula, the affairs of which were placed in 1886, under a British officer residing at Kwalla Pilah. The confederacy comprises Sri Menanti, Rembau, Johol, Tampin, and other small states, numbering,

as its name implies, nine states in all, and comprising about 2,000 square miles. Its revenue in 1889 was \$100,898. See Britannica, Vol. XV, p. 322.

NEGRO, see Britannica, Vol. XVII, pp. 316-320, and also UNITED STATES, in these Revisions and Additions.

NEGUNDO, a genus of trees of the natural order *Aceraceae*, differing from the maples chiefly in the dioecious flowers being destitute of petals, and in the pinnated ash-like leaves.

NEGUS, a compound of port or sherry and hot water, sweetened with sugar and flavored with lemon-peel and spices. It derives its name from Colonel Francis Negus.

NEHLIG, VICTOR, a French-American painter, born at Paris in 1830. After studying at Paris he settled in New York in 1856. Here he was elected an associate of the National Academy in 1863, and a full member in 1870. His paintings are characterized by admirable drawing of the figures, which he took mostly from American history. His principal works are *The Cavalry Charge of St. Harry B. Hidden*, in the New York Historical Society; *Gertrude of Wyoming*; *Hiawatha and Minnehaha*; *Battle of Antietam*; *Battle of Gettysburg*, and *The Princess Pocahontas* (1872). He returned to Europe in 1872.

NELLSVILLE, a village, the county-seat of Clark county, Wis., situated on the Black River. It is principally engaged in milling and in manufacturing lumber.

NEJIN, an ancient town of Russia, on the Oster, 80 miles northeast of Kiev. It fell into the hands of the Lithuanians in 1320, and of the Poles in 1386, but was annexed to Russia in 1654. It is an industrious town, many of whose inhabitants are Greek immigrants, who settled here during the reign of Catherine II. The principal branch of industry is the cultivation of tobacco. Great quantities of leaf-tobacco are sent hence to St. Petersburg, Riga and Mittau. Population, 21,203.

NELATON, AUGUSTE (1807-1873), a French surgeon, born at Paris in 1807, studied there, and after serving as surgeon in various hospitals and lecturing at the faculty of medicine, became in 1851 professor of clinical surgery, and in 1866 surgeon to the emperor. He became a member to the senate in 1868, and died in 1873. Besides his great *Elements de Pathologie Chirurgicale*, he wrote on tumors of the breast and the operation for cataract.

NELSON, A. HOMER, an American lawyer and statesman, born at Poughkeepsie, N. Y., in 1829, died in 1891. He studied and practiced law in his native town; became county judge in 1855; member of Congress in 1863; member of the convention for revising the State constitution in 1867; secretary of State in 1867, and State senator in 1882.

NELSON, DAVID, an American clergyman, born near Jonesborough, Tenn., in 1793, died at Oakland, Ill., in 1844. He studied medicine at Danville, Ky., and at the Philadelphia Medical School. He was surgeon of a Kentucky regiment in the war of 1812. At that time he was an infidel. But he returned to the religious belief in which he had been trained, gave up a lucrative medical practice in his native place and became a Presbyterian minister in 1825. After preaching for three years in Tennessee, and for two years at Danville, Ky., he removed in 1830 to Missouri and established Marion College, 12 miles from Palmyra, Mo., of which school he became president. He was an ardent advocate of emancipation, and, on account of troubles arising from this cause, he removed in 1836 to Quincy, Ill., where he conducted an institute for the training of missionaries. Dr. Nelson was the author of *The Cause and Cure of Infidelity* (1836), which has been re-published in London and elsewhere.

NELSON, ROBERT, born in London in 1656, died at Kensington, Jan. 16, 1715. After a brief space at St. Paul's school, he removed with his widowed mother to Dryfield, where he was brought up. In 1680, the year of his election to the Royal Society, he set out with Halley on a twenty months tour in France and Italy, returning from Italy with Lady Theophila Lucy, a widow, and daughter to the Earl of Berkeley, who in 1683 became his wife, and who soon after was converted to Catholicism by Cardinal Howard and Bossuet. Her ill-health had taken them again to Italy at the time of the revolution; but Nelson was from the first a Jacobite, and on his return to England in 1691 he joined the Nonjurors. He was received back into the Established Church in 1710, though he still would not join in the prayers for Queen Anne. His whole life was devoted to doing good. He was the author of five devotional works, one of which, the *Festivals and Fasts*, 10,000 copies were sold in four and a half years.

NELSON, THOMAS, a signer of the Declaration of Independence, born in York county, Va., in 1738, died at Yorktown, Va., in 1789. He was a member of the provincial conventions in 1774-5, and was made colonel of a Virginia regiment, but resigned on being elected to the Continental Congress. Here he signed the Declaration of Independence. During the war he made large advances from his private property for the benefit of the State, for which he never received any compensation from the government. In 1781 he became governor of Virginia. At the siege of Yorktown he commanded the Virginia militia, and was praised for bravery by Gen. Washington. After that he lived in retirement, his vast estate having been sold for his public debts.

NELSON, WILLIAM, an American general, born at Maysville, Ky., in 1825, died at Louisville, Ky., in 1862. In 1840 he entered the United States navy, and commanded a battery at the siege of Vera Cruz in 1847. In 1858 he was on the Niagara which carried back to Africa the negroes taken from the captured slaver Echo. At the beginning of the war he was made brigadier-general of volunteers, and commanded the second division of Buell's army at the battle of Shiloh. He was in command of Louisville, when that city was threatened by General B. Bragg. In 1862 he was made major-general of volunteers. He was shot dead by General Jefferson C. Davis in an altercation with that officer on Sept. 29, 1862, at the Galt house, in Louisville.

NELSONVILLE, a town of Ohio, on the Hocking River, fourteen miles southwest of Athens. It is extensively engaged in manufacturing and in the mining of coal. Population in 1890, 4,547.

NELUMBO, a genus of aquatic plants included by some botanists in the natural order *Nymphaeaceae*, but by others constituted into an order, *Nelumbaceae*, a differing in the want of albumen in the seed, and in the distinct carpels, which are buried in the cavities of a large fleshy receptacle. The flowers and leaves are very similar to those of water-lilies. The species are few, and are found in the warm parts of Asia, and in North America. They are all distinguished by the beauty of their flowers.

NEMI, LAKE OF, an extinct crater, 20 miles south of Rome, accounted for its beauty the gem of the Alban mountains. There was here a famous temple of Diana, portions of which have been recently excavated. Renan's *Prêtre de Nemi* gives the place additional interest.

NEMOPHILA, a genus of herbaceous annuals belonging to the natural order *Hydrophyllaceae*, with pinnatifid leaves and conspicuous flowers. Natives of North America, they are cultivated in European

gardens, the *N. insignis* being prized as a border plant on account of its showy flowers, blue with a white centre.

NEMOURS, LOUIS CHARLES PHILIPPE RAPHAEL D'ORLÉANS, Duc De, born at Paris in 1814, being the second son of King Louis Philippe. In 1834, after he had served two campaigns in the field, he was made marshal. In 1836 he went to Algeria, where he rose to the rank of lieutenant-general. In 1848, when the revolution broke out, he assisted with his troops the royal family to escape to England. After the downfall of the empire in 1870 he returned to France and was restored to the list of generals. In 1879 he was placed on the retired list. Nemours was in 1840 married to the Duchess of Coburg-Gotha. He had two sons, Louis, Comte d'Eu, married to a daughter of Dom Pedro II., ex-Emperor of Brazil, and Ferdinand, Duc d'Alençon, married to a daughter of Duke Maximilian of Bavaria.

NEMOURS, an ancient town in the French department of Seine-et-Marne, 40 miles southeast of Paris by rail. It gives a ducal title to the second son of Louis Philippe, born in 1814. Population, 4,268.

NEOZOIC (Gr. "new life") a term introduced by Edward Forbes to include all the strata from the Trias to the most recent deposits. Few geologists have adopted the term; the systems in question being generally divided into the groups of Secondary or Mesozoic, Tertiary or Cainozoic, and Quaternary or Post-Tertiary.

NEPOTISM, (Ital. *nepote*, "a nephew"), a word used to signify the custom-practiced by several popes subsequent to Innocent VIII. of granting high honors, dignities, offices, pensions, and the like to their family relations, generally their nephews, altogether irrespective of merit.

NERÉITES, the name given to animals which have left their impress on the Silurian rocks, and which exhibit a form similar to the modern Nereis. They occur on the surface of the laminae of fine shales over which, when it was soft, the creature moved, leaving a long and tortuous trail.

NERVAL, GÉRARD DE, the adopted name of Gérard Labrunie one of the most attractive but ill-starred figures among the French Romanticists, born at Paris, May 21, 1808, died Jan. 25, 1855. He was educated along with Gautier at the Lycée Charlemagne, and early took to letters, publishing at twenty a translation of *Faust* which pleased Göthe, and gave his choruses to Berlioz. Desultory work, a love affair cut short by death, fits of restless travel, of dissipation, and the gloom that at times deepened into mental darkness, and at last death, almost certainly by his own hand, sum up the wretched story of his life. He moved in a romantic dream-world all his days, squandered money, when he had it, prodigally upon *bric-a-brac*, read deeply in Greek, Italian, German, English, and Arabic, and wandered carelessly over Italy, Germany, Greece, Syria, Palestine, and Egypt. Gérard de Nerval wrote admirably alike in prose and verse, his style ever delicate, natural, and original, informed with a subtle personal charm of a quite remarkable character. His *Aurélien, ou le Rêve et la Vie*, is an experience of his own madness. "This strange work," says Andrew Lang, "does for insanity what the *Dream of Gerontius* has done for death." Another book of singular interest is the mélange entitled *La Bohème Galante*. Some of his most charming poems are graceful adaptations of French peasants' folk-songs, the beauty of which he had ears to hear.

NERVII, a powerful and warlike people of the ancient Gallia Belgica, whose territory stretched

from the Sambre to the ocean, not subdued by Cæsar without an obstinate resistance.

NESLE, TOUR DE. The ancient castle of the noble family Nesle stood, with its gate and tower, at an angle of the city wall of Paris, on the south bank of the Seine, where now stands the palace of the Institute. It came into the hands of the crown, was the scene of events recorded by Brantome, and was bought by Cardinal Mazarin as the site for his college.

NETHERLANDS. For general article on the Netherlands, see **HOLLAND** in *Britannica*, Vol. XII, pp. 50-99. The officially estimated area in 1889 was 12,648 English square miles; population, 4,548,596. Capital, Amsterdam, with a population in 1889, of 406,316.

The following table gives the areas and the populations of the eleven different provinces of the kingdom as reported by the census of Dec. 31, 1889:

Provinces.	Area, English square miles.	Population.	
		Dec. 31, 1889.	Per. sq. mile.
North Brabant..	1,980	514,278	259.7
Guelders.....	1,965	515,026	263.0
South Holland..	1,166	957,834	821.4
North Holland..	1,070	831,395	783.5
Zeeiland.....	690	201,667	292.2
Utrecht.....	594	232,250	416.1
Friesland.....	1,282	337,507	263.2
Overijssel.....	1,291	297,545	230.4
Groningen.....	790	227,224	287.6
Drenthe.....	1,030	131,671	127.8
Limburg.....	850	262,199	308.4
Total.....	12,648	4,548,596	359.6

Of the total population in 1889, there were 2,252,742 males, and 2,295,854 females.

CONSTITUTION AND GOVERNMENT.—The first constitution was given in 1815. This was revised in 1848, and the last revision was completed in 1887. Under this revised constitution the "Netherlands form a constitutional and hereditary monarchy." The royal succession is in the direct male line in the order of primogeniture; in default of male heirs, the female line ascends to the throne. In default of a legal heir, the successor to the throne is designated by the king and a joint meeting of both the houses of parliament (each containing twice the usual number of members), and by this assembly alone if the case occurs after the king's death. The age of majority of the king is 18 years. During his minority the royal power is vested in a regent—designated by law—or in some cases in the State council.

The executive power of the state belongs exclusively to the sovereign, while the whole legislative authority rests conjointly in the king and parliament, the latter—called the states-general—consisting of two chambers. The upper or first chamber is composed of fifty members, elected by the provincial states from among the most highly assessed inhabitants of the eleven provinces, or from among some high and important functionaries, mentioned by bill. The second chamber of the states-general numbers 190 deputies, and is elected directly from among all the male citizens who are 30 years of age and are not deprived by judicial sentence of their eligibility or the administration and the disposal of their property. Voters are all male citizens, 23 years of age, who have paid either a ground-tax of at least 10 guilders, or a direct tax (per-

sonal) to an amount higher than the sum which gives partial exemption from taxation, and which varies according to population, or who are lodgers according to the precepts of the law. The total number of electors, according to the new constitution is 290,000, which gives one voter in about 15 persons. The members of the second chamber receive an annual allowance of 2,000 guilders, besides traveling expenses. They are elected for 4 years and retire in a body, whereas the first chamber is elected for 9 years, and every three years one-third retire by rotation. The king has the power to dissolve both chambers of parliament, or one of them, being bound only to order new elections within 40 days and to convoke the new meeting within two months.

The government and the second chamber only have the right of introducing new bills; the functions of the upper chamber being restricted to approving or rejecting them, without the right of inserting amendments. The meetings of both chambers are public, though each of them, by the decision of the majority, may form itself into a private committee. The ministers can attend at the meetings of both chambers, but they have only a deliberative voice, unless they are members. Alterations in the constitution can be made only by a bill declaring that there is reason for introducing those alterations, followed by a dissolution of the chambers and a second confirmation by the new states-general by two-thirds of the votes. Unless it is explicitly declared, the laws concern only the realm in Europe, and not the colonies.

The executive authority, belonging to the sovereign is a responsible cabinet council of six ministers. Each minister receives an annual salary of 12,000 guilders, or about \$5,000.

There is a "State council" (*Rad van State*), appointed by the sovereign, of which council he is president. This council is consulted on all legislative, and many executive matters.

PRESENT REIGNING SOVEREIGN AND ROYAL FAMILY.—Queen Wilhelmina Helena Pauline, born Aug. 31, 1880, daughter of the late King Willem III,* and of his second wife, Princess Emma, born Aug. 2, 1858, daughter of Prince George Victor of Waldeck.

QUEEN REGENT.—Emma, queen-dowager, mother of the queen, who took oath as queen-regent Nov. 20, 1890, after the late king had been declared unable to reign by the states-general.

AUNT OF THE QUEEN.—Princess Sophie, sister of the late King Willem, born April 8, 1824; married Oct. 8, 1842, to Grand-Duke Karl Alexander of Saxe-Weimar, born June 24, 1818.

King Willem II. had a civil list of 1,000,000 guilders, but the amount was reduced to 600,000 guilders at the commencement of the reign of the present king. There is also a large revenue from domains, and in addition an allowance of 50,000 guilders for the maintenance of the royal palaces. The heir-apparent has 100,000 guilders, which sum is doubled in case of a marriage with the consent of the states-general. The queen-widow receives an annual allowance of 150,000 guilders. The family of Orange is, besides, in the possession of a very large

* Willem III., born Feb. 19, 1817; the eldest son of King Willem II., and of Princess Anna Paulowna, daughter of Emperor Paul I. of Russia; educated by private tutors, and at the University of Leyden; succeeded to the throne at the death of his father, March 17, 1849. Married June 18, 1839, to Princess Sophie, born June 17, 1818, the second daughter of King Wilhelm I. of Württemberg; widower June 3, 1877. Married in second nuptials, Jan. 7, 1879, to Queen Emma, born Aug. 2, 1858, daughter of Prince George Victor of Waldeck.

private fortune, acquired in greater part by King Willem I. in the prosecution of vast enterprises tending to raise the commerce of the Netherlands.

CHRONOLOGICAL HISTORIC OUTLINE.—The present royal family of the Netherlands is known as belonging to the House of Orange. This family is descended from a German Count Walram, who lived in the 11th century. Through the marriage of Count Engelbrecht, of the branch of Otto, Count of Nassau, with Jane of Polanen, in 1404, the family acquired the barony of Breda, and thereby became settled in the Netherlands. The alliance with another heiress, the only sister of the childless Prince of Orange, and Count of Châlons, brought to the house a rich province in the south of France; and a third matrimonial union, that of Prince Willem III. of Orange with a daughter of King James II., led to the transfer of the crown of Great Britain to that prince. Previous to this period, the members of the family had acquired great influence in the "Republic of the Netherlands" (q. v. in Britannica, Vol. XII, pp. 50-99) under the name of "stadtholders," or governors. The dignity was formally declared to be hereditary in 1747, in Willem IV.; but his successor, Willem V., had to fly to England, in 1795, at the invasion of the French republican army.

The family did not return till November, 1813, when the fate of the Republic, released from French supremacy, was under discussion at the congress of Vienna. After various diplomatic negotiations, the Belgian provinces, subject before the French revolution to the House of Austria, were ordered by the congress to be annexed to the territory of the Republic, and the whole to be erected into a kingdom, with the son of the last Stadtholder, Willem V., as hereditary sovereign under the title of Willem I. In consequence, the latter was proclaimed king of the Netherlands at the Hague on the 16th of March, 1815, and recognized as sovereign by all the powers of Europe. The established union between the northern and southern provinces of the Netherlands was dissolved by the Belgian revolution of 1830, and their political relations were not re-adjusted until the signing of the treaty of London, April 19, 1839, which constituted Belgium an independent kingdom. King Willem I. abdicated in 1840, bequeathing the crown to his son Willem II., who, after a reign of nine years, died (March 17, 1849) leaving it to his heir, Willem III. The later years of Willem III. were characterized by illness causing at times serious apprehension as to his ability to continue his administration as sovereign, and Queen Emma was authorized to act as regent, if necessary; the first bill to that effect was passed Aug. 1, 1884; a second bill making the same provision was passed in April, 1889; and a like bill passed both chambers Nov. 14, 1890. In the last case the queen accepted the regency and took the oath of office Nov. 20, 1890.* King Willem III. died Nov. 23, 1890, leaving his daughter Wilhelmina, only ten years of age, sovereign in the order of succession, with Queen Emma as queen-regent during the minority of the queen.

LATER CENSUS RETURNS OF CITIES.—On Jan. 1, 1889, the towns of more than 15,000 inhabitants each reported populations as follows:

Amsterdam.....	389,424	Bois-le-Duc.....	26,742
Rotterdam.....	197,722	('s Hertogenbosch)	
The Hague.....	158,340	Zwolle.....	25,914
('s Gravenhage)		Schiedam.....	20,428
Utrecht.....	85,304	Breda.....	21,385
Groningen.....	54,322	Deventer.....	22,914
Haarlem.....	50,974	Helder.....	22,716
Arnhem.....	49,005	Gouda.....	19,808
Leiden.....	46,379	Kampen.....	18,767
Tilburg.....	38,177	Apeldoorn.....	18,583
Maastricht.....	39,034	Zutphen.....	17,044
Nimeguen.....	31,742	Middelburgh.....	16,743
Dordrecht.....	31,729	Alkmaar.....	15,500
Leeuwarden.....	29,717	Amersfoort.....	15,244
Delft.....	27,997	Zaandam.....	15,006

FINANCIAL SUMMARIES AND DEFENSE.—The Government budget for 1891 estimated the revenues at 126,536,025 guilders, and the expenses at 135,930,839 guilders.

The total debt of the Netherlands is 1,111,517,160 guilders (about \$463,132,150).

The southern and eastern frontiers are defended by few fortresses. The most effective means of defending the Netherlands consists in piercing the dykes and inundating a great stretch of land between the sea and the river, the Lek. The few roads lying above the level of the water are guarded by fortresses connected with each other; the river can be defended by gun-vessels if necessary. A large part of the province of Utrecht, besides North and South Holland, with the principal towns, is thus secured.

The army of the Netherlands, which was reorganized partly on the system of Germany in 1881, is formed partly by conscription and partly by enlistment, the volunteers forming the stock, but not the majority of the troops.

The regular army on footing of war consists of 36,912 infantry, 2,610 cavalry, 1,526 engineers, 13,619 artillery, 375 mounted police (maréchaussée); in all, about 55,000 men, including officers and special services.

In peace the total number of the army is only 26,818 men and 1,826 officers (in 1888).

Included in the infantry are 1 regiment of guards and 8 regiments of the line; there are 3 regiments of cavalry, 1 battalion of sappers and miners, 3 regiments of field artillery, 4 of fortress artillery, 1 corps of light-horse artillery, 1 corps of pontooneers, and 1 corps of torpedoists.

The colonial possessions of the Netherlands in the East and West Indies on Jan. 1, 1891, were estimated to embrace an area of 766,137 square miles, with an aggregate population, according to the latest returns, of 29,550,000, or more than six times as large as that of the mother country. The subjoined table formulates the estimated summaries for the several Dutch possessions in the East Indies.

Java and Madura.....	50,848	22,430,043
Sumatra, west coast.....	46,200	1,190,791
Sumatra, east coast.....	16,282	277,784
Island of Benkulen.....	9,576	152,898
Sumatra Lampungs.....	9,975	123,891
Palembang.....	61,152	697,197
Acheh.....	6,370	542,673
Riau-Lingga Archipelago.....	17,325	94,743
Banda.....	4,977	76,351
Billiton.....	2,000	36,035
Borneo, west coast.....	58,226	413,694
Borneo, south and east districts.....	144,788	677,939
Islands of Celebes.....	45,150	402,211
Celebes / Menado.....	26,000	446,986
Molucca Islands.....	42,420	352,023
Timor Archipelago.....	21,840	45,321
Ball and Lombok.....	8,990	1,363,806
New Guinea to 141° E. longitude.....	150,755	200,000
Total.....	719,674	29,475,613

For a concise statement of the recent delimitation and division of New Guinea defining boundaries of the Netherlands in that great island, see

* The queen regent on Nov. 24, 1890, issued an official proclamation in which she said: "Appointed as regent during the queen's minority, I accept the task, confiding in God, and praying that its accomplishment may assure the welfare of the country and people, and the consolidation of the kingdom."

article **NEW GUINEA** in these Revisions and Additions.

NETTLETON, ASAHEL, an American evangelist, born at North Killingworth, Conn., in 1783, died at East Windsor, Conn. in 1844. He studied theology at New Haven, and was ordained as an evangelist in 1817. His preaching was very successful in Massachusetts, New York, and Connecticut. In 1827 he went to Virginia for his health and in 1831 to Great Britain. After his return he lectured occasionally to the students of the Theological Seminary at East Windsor. He is best known by his collection of *Village Hymns* and his *Sermons* edited by Rev. Dr. B. Tyler.

NEUHAUS, a town of Bohemia, on the Nescharka, about seventy miles south-southeast of Prague. Its palace, belonging to Count Czerny, is a splendid edifice. Cloth, paper, and chemical products are manufactured. Population, 8,620.

NEUKOMM, SIGISMUND, a German composer, born at Salzburg in 1778, died at Paris in 1858. From 1804 till 1820 he taught music at St. Petersburg, Vienna, Paris, and Rio de Janeiro. In 1821 he returned to Paris, living at the house of Prince Talleyrand, and went with him to England in 1830. He produced about 800 compositions, composing operas, cantatas, symphonies, songs, etc. *Mount Sinai* (1831); and *David* (1834) are his most noted works. Towards the end of his life Neukomm became blind.

NEURITIS, a term applied to inflammation of the nerves. The disease is not very common, and not very well defined. The symptoms are those of neuralgia, with impairment of sensation, or localized paralysis, according as sensory or motor nerves are affected.

NEUTRALITY, see *Britannica*, Vol. XIII. p. 195 and **ALABAMA CLAIMS** in these Revisions and Additions.

NEUVILLE, ALPHONSE MARIE DE, the most popular of the youngest of French painters of battle-scenes, born at St. Omer, May 31, 1836, died in Paris, May 20, 1885. After studying under Delacroix, he painted a series of successful pictures illustrative of French exploits in the Crimean war, Italy, and Mexico. Then came the war with Germany. Neuville fought in the ranks and learned something of real warfare from actual experience. This knowledge imparted additional power to his next and last series of works, depicting incidents of that war. The attack at Rorke's Drift and that at Tel-el-Kebir were also chosen by him as subjects for pictures. Neuville excelled moreover as an illustrator of books, his best work in this line being the designs for Guizot's *Historie de France*.

NEVADA CITY, a city, the county-seat of Nevada county, Cal. It contains a number of quartz-mills, and has excellent schools.

NEVADA, STATE OF. For general article on NEVADA, see *Britannica*, Vol. XVII. pp. 367-69. The census of 1890 reported area and population of the State as follows: Area, 110,700; population, 45,761, a decrease during the decade of 16,505, or 28.81 per cent. Capital, Carson city, of 4,980. Virginia City had a population in 1890 of 6,337; Gold Hill, 2,073.

The complete list of governors of Nevada, is as follows:

TERRITORY.

James W. Nye, 1861-64.

STATE.

Henry G. Blaisdell..... 1864-71	Jewett D. Adams..... 1883-87
Louis R. Bradley..... 1871-79	C. C. Stevenson..... 1887-91
John H. Kinkade..... 1879-83	E. K. Colcord..... 1891-95

Governor Colcord's official term expires Jan. 3, 1895. The governor's salary is \$5,000.

The land area and the population of the State of Nevada, by counties, was as follows:

Counties.	Area.	Population.	
		1890.	1880.
Churchill.....	4,852	703	479
Douglas.....	892	1,551	1,531
Elko.....	17,652	4,794	5,716
Esmeralda.....	8,540	2,148	3,220
Eureka.....	4,150	3,275	7,086
Humboldt.....	16,580	3,434	3,490
Lander.....	5,296	2,266	3,624
Lincoln.....	17,688	2,468	2,637
Lyon.....	1,264	1,987	2,409
Nye.....	16,908	1,290	1,875
Ormsby.....	144	4,883	5,412
Roop.....	348	268	266
Storey.....	270	8,806	16,115
Washoe.....	5,620	6,089	5,664
White Pine.....	9,892	1,721	2,682

CONDENSED HISTORIC OUTLINE.—Nevada covers a part of the territory ceded by Mexico to the United States by the treaty of Guadalupe Hidalgo, Feb. 2, 1848. It was first a part of California, and was, later, included in Utah. It was made a territory March 2, 1862, and was admitted as a State Oct. 31, 1864. Congress made additions to the State domain in 1866.

Progress of population by decades: 1860, 6,857; 1870, 42,491; 1880, 66,266 (including 53,556 whites, 8,710 colored, 5,416 Chinese, 8,203 Indians, and 3 Japanese); 1890, 45,761.

For numerous other items of interest relating to Nevada, see article **UNITED STATES**, in these Revisions and Additions.

NEW ALBANY, the county-seat of Floyd county, Ind., on the north bank of the Ohio River, nearly opposite Louisville. Population in 1890, 21,059. See *Britannica*, Vol. XVII. p. 369.

NEWARK, a port of entry and the county-seat of Essex county, N. J., on the Passaic River, nine miles west of New York. Population in 1890, 181,830. See *Britannica*, Vol. XVII. p. 370.

NEWARK, the county-seat of Licking county, Ohio, on the Licking River, 83 miles east of Columbus. Population in 1890, 14,270. See *Britannica*, Vol. XVII. p. 371.

NEWARK, a village of New Castle county, Del., about 12 miles southwest of Wilmington, Del. It is the center of various manufacturing industries and the seat of Delaware College, of Delaware Agricultural College and of an academy.

NEWARK, a village of New York, about 30 miles southeast of Rochester. It contains several mills, furnaces, foundries and factories and a number of educational institutions.

NEW BEDFORD, a city and port of entry of Massachusetts, on the Acushnet estuary, 56 miles south of Boston. Many of its private residences are very handsome, while the public buildings include a city hall of granite, a custom-house, 30 churches, a public library and a fine high-school building which cost \$126,000. There is a broad drive (four miles) round Clark's Point, at the extremity of which there is a strong granite fort. For a century (1755-1854) New Bedford was the chief center of the American whale-fisheries, sending out more than 400 whaling-vessels, and receiving 60,000 barrels of sperm and 120,000 of whale oil in a year; but this industry has since declined, till now only some 80 whaling-vessels belong to the

port, and the people have turned their attention mainly to manufactures. Besides several great cotton-mills (nearly 500,000 spindles), the city contains foundries, oil-refineries and manufactories of drills, cordage, boots and shoes, flour, glass, plated ware, carriages, candles, etc. Population in 1890, 40,733. See *Britannica*, Vol. XVII, p. 375.

NEW BERNE, a city, a port of entry and the county-seat of Craven county, N. C., situated at the junction of the navigable Neuse and the Trent, 107 miles southeast of Raleigh. Population in 1890, 7,832. See *Britannica*, Vol. XVII, p. 372.

NEWBERRY, JOHN STRONG, an American geologist, born at Windsor, Conn., in 1822. After studying medicine at the Cleveland Medical College and traveling in Europe, he settled as a physician at Cleveland, Ohio, in 1851, where he remained till 1855. In the latter year he joined an expedition for exploring the country between San Francisco and the Columbia River. He also joined Lieut. Ives, in 1857, in the exploration and navigation of the Colorado River, spending nearly a year in exploring the great cañon. The summer of 1859 he spent in traveling over southern Colorado, Utah, northern Arizona, and New Mexico, studying a large area of country that was before unknown. In 1861 Dr. Newberry became a member of the United States Sanitary commission. He had charge of all the work of this commission in the Mississippi Valley, with headquarters at Louisville, Ky. After the war he was made professor of geology at the Columbia School of Mines, New York City, and in 1869 he was appointed State geologist of Ohio. In 1884 he was made paleontologist of the United States geological survey, and has had charge of the fossil fishes and plants. As a geologist and a paleontologist he occupies one of the foremost places. His publications include *The Geology, Botany, and Zoology of Northern California and Oregon*; *Geology of the Colorado Expedition*; *Geology of the San Juan Expedition*; *Reports of the Geological Survey of Ohio*; *Iron Resources of the United States*, and several other works on geology and paleontology.

NEWBERRY, JOHN (1713-1767), a London bookseller, intimately associated with Dr. Johnson, Goldsmith, Christopher Smart, Smollett, and many other men of letters. He settled in London as a vender of books and medicines. He was the first to publish little books for children such as have ever since been popular, and he was himself part author of some of the best of the series, as the histories of Goody Two-Shoes, and Giles Gingerbread and the travels of Tommy Trip. In 1758 he started the "Universal Chronicle, or Weekly Gazette," in the numbers of which the celebrated "Idler" was first printed. The "Public Ledger," commenced in 1760, has continued to our own day—in its early numbers appeared Goldsmith's "Chinese Letters," later reprinted as *The Citizen of the World*.

It was to Francis Newbery, his nephew and ultimate successor, that Boswell tells us Dr. Johnson told him he sold for sixty pounds the manuscript of Goldsmith's *Vicar of Wakefield*, in which John Newbery has been immortalized as "the philanthropic bookseller in St. Paul's Churchyard, who has written so many little books for children. He called himself their friend, but he was the friend of all mankind."

NEW BRITAIN, a manufacturing town of Connecticut, nine miles southwest of Hartford. Population in 1890, 19,007. See *Britannica*, Vol. XVII, p. 372.

NEW BRITAIN, an island in the Pacific Ocean. It now forms, with New Ireland and the north-eastern part of New Guinea or Papua, the German protectorate known as Kaiser Wilhelm's Land. See

NEW GUINEA, in these Revisions and Additions; also *Britannica*, Vol. XVI, p. 372.

NEW BRUNSWICK, the county-seat of Middlesex county, N. J., at the head of navigation on the Raritan River, thirty-one miles southwest of New York. Population in 1890, 18,603. See *Britannica*, Vol. XVIII, p. 375.

NEWBURGH, a city, the county-seat of Orange county, N. Y., on the west bank of the Hudson, fifty-seven miles north of New York, amid the grand scenery of the Highlands. Population in 1890, 23,087. See *Britannica*, Vol. XVII, p. 376.

NEWBURYPORT, a city and port of entry of Massachusetts, on the south bank of the Merrimack, three miles from its mouth, and thirty-seven miles northeast of Boston. Population in 1890, 13,947. See *Britannica*, Vol. XVII, p. 375.

NEW CASTLE, a city, the former county-seat of New Castle county, Del., and a port of entry, on the Delaware River, about six miles below Wilmington. It contains numerous manufacturing and educational institutions. Population in 1890, 3,916.

NEW CASTLE, a village, the county-seat of Henry county, Ind., on Blue River, fifteen miles south of Muncie. It contains a number of manufactories and has a good local trade.

NEWCOMB, SIMON, astronomer, born at Wallace, Nova Scotia, March 12, 1835. He graduated at the Lawrence Scientific School at Harvard, and in 1861 became a professor of mathematics in the United States Navy. He was appointed to the naval observatory at Washington, and in 1877 was placed at the head of the office of the official "American Ephemeris and Nautical Almanac." He organized the Government expedition to observe the transit of Venus in 1874, and in 1882 observed the transit of the same planet at the Cape of Good Hope; he had already been sent to Saskatchewan and to Gibraltar to observe eclipses of the sun. In 1884 he undertook, in addition, the duties of the chair of Mathematics and Astronomy in the Johns Hopkins University. His writings embrace over a hundred papers and memoirs, and include especially most exact tables of the motions of the planets. See *Britannica*, Vol. XVII, p. 311; Vol. XV, p. 664.

NEWDIGATE, SIR ROGER (1719-1806), was born and died at Arbury in Warwickshire, having sat for many years in parliament as member for Middlesex and the University of Oxford. He was a great antiquary, but is chiefly remembered as the endorser of the Newdigate prize poem at Oxford.

NEW ENGLAND, a collective name given to the six Eastern States of the United States—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut—embracing an area of 65,000 square miles. The joint population in 1890 was 4,692,904; this is more than one-thirteenth of the entire population of the Republic, while the area of New England is less than one-fiftieth of the total area of the United States.

NEWENT, an old market-town of England, eight miles northwest of Gloucester. Population of parish, 2,889.

NEW GUINEA, or **PAPUA**. For general article embracing the early history of **NEW GUINEA**, see *Britannica*, Vol. XVII, pp. 386-390. Next to Australia, New Guinea is the largest island in the world. It has an extreme length of 1,490 miles, a breadth of 410 miles, and a total area now estimated at 305,900 square miles.

Since the close of the historic record in the *Britannica*, above referred to, the proprietary jurisdiction of the island has been greatly changed. The half lying west of the 141st meridian has been

assigned to the Netherlands. It comprises 150,755 square miles, and includes a population of about 200,000. The northern section of Southeast New Guinea, comprising 70,300 square miles, was named Kaiser Wilhelm's Land, and was declared to be under a German protectorate in 1884. The present English territory in New Guinea starts from the northeast coast on the 8th parallel of south latitude and follows it to its intersection with the 147th meridian; thence northwest to the intersection of the 6th degree of south latitude with the 144th degree of east longitude; thence west-northwest to the intersection of the 5th degree of south latitude, and 141st degree of east longitude. The adjacent islands north of 8 degrees south latitude are German; those south of that latitude are English. The English territory has an estimated area of 86,457 square miles, and a population of 135,000, with Port Moresby as the official center.

The delimitation and division of New Guinea between Great Britain, Germany, and the Netherlands (or Holland) was finally settled in 1885.

NEW HAMPSHIRE, STATE OF. For general article on New Hampshire, see *Britannica*, Vol. XVII, pp. 370-393. The census of 1890 reports the area and population as follows: Area, 9,305 square miles; population, 376,530, an increase of 29,539 during the decade. Capital, Concord, with a population of 17,004.

The populations of the chief cities and towns in New Hampshire in 1880 and 1890 are given in the subjoined table:

	Pop. 1890.	Pop. 1880.	In- crease.	Per cent.
Concord	17,004	13,843	3,161	22.83
Dover	12,790	11,687	1,103	9.44
Manchester	44,126	32,630	11,496	35.23
Nashua	19,311	13,397	5,914	44.14
Portsmouth	9,827	9,690	137	1.41

Other cities and towns reporting each a population of over 3,000 were the following: Gileford, 3,585; Laconia, 6,143; Wolfeborough, 3,020; Berlin, 3,729; Lancaster, 3,373; Lebanon, 3,763; Lytleton, 3,365; Milford, 3,014; Franklin, 4,085; Pembroke, 3,172; Exeter, 4,284; Farmington, 3,064; Rochester, 7,396; Somersworth, 6,207, and Claremont, 5,565.

The land area in square miles and the population, severally, of the counties of the State in 1890 were as follows:

Counties,	Area.	Population.	
		1890.	1880.
Belknap.....	392	20,321	17,984
Carroll.....	907	18,124	18,224
Cheshire.....	784	29,579	28,734
Cos.	1,771	23,211	18,580
Grafton.....	1,766	87,217	38,788
Hillsborough.....	244	93,247	75,694
Merrimack.....	909	49,485	46,300
Rockingham.....	709	49,650	49,054
Stafford.....	376	38,442	35,558
Sullivan.....	547	17,304	18,161

CONDENSED HISTORIC RECORD.—New Hampshire was first visited in 1603 by whites under Martin Pring. In 1614 Capt John Smith visited the Piscataqua River and the adjacent coast. In 1622

the territory between the Merrimack and Kennebec rivers, and from the coast sixty miles inland, was granted by the council for New England to Sir Ferdinand Gorges and Capt. John Mason, for a province to be called "Province of Maine" (q. v.). The first English settlement in this province west of Piscataqua River was made in the spring of 1623, near the present site of Rye. Later, Gorges and Mason divided their territory, the latter taking all west of the Piscataqua River. The council confirmed this grant to Mason in 1629; the boundaries were the middle of the Merrimack and Piscataqua rivers, the sea coast and a line nearly parallel and 60 miles distant, the grants including also, all islands on the coast "within 5 leagues thereof." Mason called the tract New Hampshire, after Hampshire, England. Mason died in 1635, and a large portion of the colony was annexed to Massachusetts. In 1679 a royal commission decided against the claims of Massachusetts and re-organized the Province of New Hampshire. The present limits of New Hampshire were substantially fixed by royal declaration in 1740. A State constitution was adopted in 1784. Concord became the capital in 1805.

The complete list of governors of the State of New Hampshire is as follows:

GOVERNORS OF NEW HAMPSHIRE.

Josiah Bartlett.....	1792-94	Samuel Dinsmore.....	1840-52
John T. Gilman.....	1794-1805	Noah Martin.....	1852-54
John Langdon.....	1805-09	Nathaniel B. Baker.....	1854-55
Jeremiah Smith.....	1809-10	Ralph Metcalf.....	1855-57
John Langdon.....	1810-12	William Halle.....	1857-59
William Plumer.....	1812-13	Ichabod Goodwin.....	1859-61
John T. Gilman.....	1813-16	Nathaniel S. Berry.....	1861-63
William Plumer.....	1816-19	Joseph A. Gilmore.....	1863-65
Samuel Bell.....	1819-23	Frederic Smyth.....	1865-67
Levi Woodbury.....	1823-24	Walter Harriman.....	1867-69
David L. Morrill.....	1824-27	Onslow Stearns.....	1869-71
Benjamin Pierce.....	1827-29	James A. Weston.....	1871-72
John Bell.....	1829-30	Ezekiel Straw.....	1872-74
Matthew Harvey.....	1830-31	James A. Weston.....	1874-75
Joseph M. Harper.....	1831	Person C. Cheney.....	1875-77
Samuel Dinsmore.....	1831-34	Benjamin F. Prescott.....	1877-79
William Badger.....	1834-36	Nathaniel Head.....	1879-81
Isaac Hill.....	1836-39	Charles H. Bell.....	1881-82
John Page.....	1839-42	Samuel W. Hale.....	1883-85
Henry Hubbard.....	1842-44	Moody Currier.....	1885-87
John H. Steele.....	1844-46	Charles H. Sawyer.....	1887-89
Anthony Colby.....	1846-47	David H. Goodell.....	1889-91
Jared W. Williams.....	1847-49	Hiram A. Tuttle.....	1891-93

Governor Tuttle's official term expires Jan. 3, 1893. The salary of the governor is \$2,000.

PROGRESS OF POPULATION BY DECADES.—1790, 141,885; 1800, 183,858; 1810, 214,460; 1820, 244,022; 1830, 259,328; 1840, 284,574; 1850, 317,976; 1860, 326,073; 1870, 318,300; 1880, 346,991; 1890, 376,530.

For numerous other items of interest relating to New Hampshire, see the article **UNITED STATES**, in these Revisions and Additions.

NEW HAMPTON, a town, the county-seat of Chicasaw county, Iowa, and the trade-center of a rich farming region.

NEW HANOVER, an island of the Bismark Archipelago, lying off the northeast coast of New Guinea, and having an area of 570 square miles. Its physical characteristics resemble those of New Britain.

NEW HAVEN, the chief city and seaport of Connecticut, and county-seat of New Haven county, at the head of New Haven Bay, four miles from Long Island Sound, and seventy-three miles northeast of New York. Population in 1890, 85,981. See *Britannica*, Vol. XVII, p. 394.

NEW IRELAND, an island in the Pacific ocean. It now forms, with the Island of New Britain and the northeastern part of New Guinea or Papua, the German protectorate known as Kaiser Wilhelm's Land. See **NEW GUINEA**, in these Revisions and Additions; also *Britannica*, Vol. XVII, p. 372.

NEW JERSEY, COLLEGE OF, see PRINCETON under the article COLLEGES AND UNIVERSITIES IN THE UNITED STATES, in these Revisions and Additions.

NEW JERSEY, STATE OF. For general article on NEW JERSEY, see *Britannica*, Vol. XVII, pp. 396-399. The census of 1890 reports the area and population as follows: Area, 7,815; population, 1,444,933, a gain during the decade of 313,817. Capital, Trenton, with a population of 57,458.

The following table shows the population of the cities and towns which had each 8,000 inhabitants and over in 1890:

Cities and Towns.	Population.		Increase.	Per cent.
	1890.	1880.		
Atlantic City.....	13,055	5,477	7,578	138.66
Bayonne.....	19,033	9,372	9,661	103.08
Bridgeton.....	11,429	8,732	2,700	30.96
Burlington.....	8,222	6,090	2,132	35.01
Camden.....	58,313	41,659	16,654	39.98
Harrison.....	37,794	28,229	9,565	33.78
Hoboken.....	8,338	6,898	1,440	20.88
Jersey City.....	163,003	120,723	42,280	40.80
Millville.....	10,992	7,660	3,332	43.37
Newark.....	181,830	136,508	45,322	33.20
New Brunswick.....	18,603	17,163	1,440	8.37
Passaic.....	18,844	13,207	5,637	42.68
Orange.....	13,028	6,532	6,496	99.25
Patterson.....	78,347	51,021	27,326	53.53
Perth Amboy.....	9,512	4,808	4,704	97.84
Phillipsburg.....	8,644	7,181	1,463	20.37
Plainfield.....	11,267	8,125	3,142	38.67
Trenton.....	57,458	29,910	27,548	92.10
Union.....	10,643	5,849	4,794	81.96

Others of the thriving cities and towns of the State reported in 1890 populations as follows: Hammoncton, 3,833; Bordentown, 5,090; Cinnaminson, 3,966; Northampton, 5,376; Cape May City, 2,136; Milburn, 2,437; Montclair, 8,656; South Orange, 4,970; West Orange, 4,358; Woodbury City, 3,911; Ewing, 3,129; Princeton, 4,231; Monroe, 3,040; Piscataway, 3,286; South Amboy, 4,330; Woodbridge, 4,665; Long Branch, 7,231; Raritan, 4,779; Upper Freehold, 4,145; Brick, 4,055; Salem City, 5,516; North Plainfield, 4,250; Summit, 3,502; Union, 2,846; Westfield, 2,216; Hackettstown, 2,417; Washington, 4,138.

The following is a full list of the Governors of New Jersey:

William Livingston.....	1789-94	David Haines.....	1849-51
William Paterson.....	1794	George F. Fort.....	1851-54
Richard Howell.....	1794-1801	Rodman F. Price.....	1854-57
Joseph Bloomfield.....	1801-12	Wm. A. Newell.....	1857-60
Araron Ogden.....	1812-13	Charles S. Olden.....	1860-63
Wm. S. Pennington.....	1813-15	Joel Parker.....	1863-66
Mahlon Dickerson.....	1815-17	Marcus L. Ward.....	1866-69
Isaac H. Williamson.....	1817-29	Theo. F. Randolph.....	1869-72
Peter D. Vroom.....	1829-30	Joel Parker.....	1872-75
Samuel L. Southard.....	1832-33	Joseph D. Bedle.....	1875-78
Elias P. Seelye.....	1833	George B. McClellan.....	1878-81
Peter D. Vroom.....	1833-36	George C. Ludlow.....	1881-84
Philemon Dickerson.....	1836-37	Leon Abbett.....	1884-87
William Pennington.....	1837-43	Robert S. Green.....	1887-90
Daniel Haines.....	1843-44	Leon Abbett.....	1890-93
Charles C. Stratton.....	1844-48		

Governor Abbett's official term closes Jan. 16, 1893. The governor's salary is \$5,000.

HISTORIC OUTLINE.—New Jersey was settled by the Dutch from New York in 1622, the first colony planting itself at Bergen. A similar settlement was made on the Delaware in 1631. All the territory from the Connecticut River to the Delaware River was granted in 1664 to the Duke of York who conveyed the southern portion of it to Lord Berkeley and Sir George Carteret. As the latter had

been governor of the Isle of Jersey in the English Channel, the name of New Jersey was given to the new territory. The Dutch and English alternately controlled it until 1682, when a company of twelve Quakers headed by William Penn purchased it, and a season of peace ensued. A State constitution was adopted in 1776. The legislature adopted the new federal constitution in 1787. Trenton became the State capital in 1790.

The land areas in square miles, and the populations of the counties of New Jersey, furnished by the census of 1890, and 1880, are shown in the subjoined table:

Counties.	Areas.	Population.	
		1890.	1880.
Atlantic.....	565	28,836	18,704
Bergen.....	235	47,226	38,786
Burlington.....	860	38,528	55,402
Camden.....	320	87,687	62,942
Cape May.....	255	11,268	9,765
Cumberland.....	505	45,438	37,687
Essex.....	127	256,098	189,329
Gloucester.....	326	28,649	35,886
Hudson.....	43	276,126	157,914
Hunterdon.....	434	36,353	38,570
Mercer.....	225	79,978	58,061
Middlesex.....	310	61,754	52,238
Monmouth.....	476	69,128	55,583
Morris.....	470	54,101	50,861
Ocean.....	478	15,974	14,455
Passaic.....	197	105,046	68,860
Salem.....	340	25,151	24,579
Somerset.....	303	26,211	27,162
Sussex.....	525	22,259	23,339
Union.....	102	72,467	55,571
Warren.....	360	36,553	36,589

PROGRESS OF THE POPULATION OF THE STATE BY DECADES.—1790, 184,139; 1800, 211,149; 1810, 245,562; 1820, 277,426; 1830, 320,823; 1840, 373,306; 1850, 489,555; 1860, 672,035; 1870, 906,096; 1880, 1,131,116; 1890, 1,444,933.

For numerous other items of interest relating to the State of New Jersey, see the article UNITED STATES in these Revisions and Additions.

NEW LEXINGTON, a village of Ohio, about sixty miles east of Cincinnati. It contains a number of mills and factories, and has a good local trade.

NEW LISBON, a village, the county-seat of Columbiana county, Ohio, on the Little Beaver River, thirty-five miles east of Canton. It contains excellent schools and a number of manufactures.

NEW LONDON, a city and port of entry of Connecticut, on the right bank of the River Thames, three miles from Long Island Sound, and fifty-one miles east of New Haven. Population in 1890, 13,759. See *Britannica*, Vol. XVII, p. 399.

NEWMAN, EDWARD, an English naturalist, born at Hampstead in 1801, died in 1876. He was a printer in London, but devoted much of his time to the study of natural history. In 1833 he founded the "Entomological Magazine," which was merged in the "Entomologist" in 1840. In 1843 he established the "Zoölogist." Among his works are *History of British Ferns*; *Introduction to the History of Insects*; *Insect Hunters*; *Bird-nesting*; *Dictionary of British Birds*; *British Moths*; and *British Butterflies* (1871).

NEWMAN, FRANCIS WILLIAM, brother of the cardinal, born in London in 1805. After a three years' stay in the East, he was appointed classical

tutor in Bristol College, 1834. In 1840 he accepted a similar professorship in Manchester New College, and in 1846 he was appointed to the chair of Latin in University College, London, which he held till 1863. He has been an active contributor to numerous literary and scientific periodicals, and to various branches of ancient and modern literature. In controversies on religion he has taken part directly opposite to that chosen by his brother, being eager for a religion in his view more world-wide, and including whatever is best in the historic religions. *Phases of Faith* is by far the most widely diffused of his works. He has also written many philosophical and mathematical works.

NEWMAN, JOHN HENRY CARDINAL, the leader of the Oxford Tractarian movement of 1833 in the church of England, born in London, Feb. 21, 1801, died there Aug. 11, 1890. He took his degree at Oxford in 1820, when he was only nineteen. In 1821 he wrote jointly with a friend two cantos of a poem on St. Bartholomew's Eve. In 1822 he was elected to a fellowship in Oriel College; and it was here that he formed his close intimacy with Dr. Pusey, and subsequently with Hurrell Froude, who had a great share in starting the Tractarian movement of 1833. Here also he formed cordial relations with Dr. Hawkins, afterwards the provost of the college, and Whately, afterwards archbishop of Dublin. Both of them exercised great influence over him by teaching him to define his thoughts clearly. Newman's first book was that on the *Arians of the Fourth Century*. It was a very careful and scholarly production, intended to show that the Arian heresy was not of Alexandrian origin, but was one of the Judaizing heresies which sprang up in Antioch. In the late autumn of 1832, Newman accompanied Hurrell Froude and his father in a Mediterranean tour undertaken in the hope of restoring the health of the former. It was on this tour that the fire kindled which was to bear fruit in the Anglican movement of 1833. Most of Newman's smaller poems were written on this voyage, and were published in *Lyra Apostolica*, a volume of verse, the object of which was to re-assert for the church of England her spiritual authority and mission with something of the ease and buoyancy of poetic license. It was on this tour that Newman first saw Monsignore (afterwards Cardinal) Wiseman in Rome, and told him gravely in reply to the expression of a courteous wish that Hurrell Froude and he might visit Rome, "We have a work to do in England." At Rome Newman left his friends to go alone to Sicily where he fell ill of malarial fever. His mind was deeply possessed during his illness by the idea of the work he had to do in England, and the delay in finding passage to England was very trying to him. At last he got passage on an orange boat to Marseilles. Becalmed in the Straits of Bonifacio, he wrote the best known of all his poems, "Lead, kindly Light." See *Britannica*, Vol. XII, p. 595. From Marseilles he traveled straight to England, reaching home in time to be present at Keble's Oxford assize sermon on National Apostasy, which he always regarded as the date at which the Tractarian movement began. Into the series of *Tracts for the Times*, which now commenced, Newman threw himself with great energy. In the first page of the first tract, he told the bishops that he could not wish them a more blessed termination of their careers than the spoiling of their goods and martyrdom. The tracts which now began to pour forth were all intended to preserve the dogmatic purity of the church as well as to guard her ritual. In 1837 he made an attempt to distinguish the Anglican *via media* from the doctrines of the Church of Rome in a course of lectures. In 1838

he followed up his discussion of the *via media* so far as it effects authority with a volume on the *via media* in its relation to the doctrine of justification by faith; maintaining that justification by faith—or the imputation without the reality of righteousness—must precede sanctification. In tract 85, published in 1838, he made an effort to apply the theology of *via media* to the interpretation of the Scripture; asserting that all revealed doctrine is to be found in Scripture, though it could not be found on the mere surface of Scripture, since it needs the guidance of tradition to help us find it. Tract 90, which gave rise to so much agitation in Oxford, was one of the least interesting of the tracts. The right wing of the Tractarian party was urging Newman to reconcile his High Church doctrines with the Thirty-nine Articles. This Newman thought a comparatively easy matter; and contended that the intention of the Articles was Catholic in spirit, and that they were aimed at the supremacy of the pope and the popular abuses of the Catholic church in practice and not at the Catholic doctrine. Tract 90 provoked an explosion which was the end of the Tractarian movement, and brought on the conversions to Rome of many of the Tractarians. Newman struggled for two years longer to think his position tenable, but in 1843 resigned the vicarage of St. Mary's and retired to Littlemore. On the 8th of October, 1845, he invited the Passionist Father Dominic to his house at Littlemore in order that he might be received into the Roman Catholic church. He went to Oscott to be confirmed; then he went to Rome for a year and a half; and on his return in 1848 he published *Loss and Gain*, the story of an Oxford conversion very different from his own, but full of happy and delicate sketches of Oxford life and manners. Shortly afterwards he began *Callista*, the story of a martyr in Africa of the third century.

In 1849 he established a branch of the brotherhood of St. Philip Neri in England. Newman established himself at Edgbaston, a suburb of Birmingham; and here he did a great deal of hard work, devoting himself to the sufferers from cholera in 1849 with the utmost zeal. The lectures on *Anglican Difficulties*, intended to show that Tractarian principles could only issue in submission to Rome, was the first book which drew public attention to Newman's great power of irony and the singular delicacy of his literary style. These lectures were followed by the lectures on "Catholicism in England," which gave occasion to Dr. Achilli's action for libel against him. In 1864 a casual remark by Canon Kingsley led to a correspondence which resulted in the publication of the remarkable *Apologetica pro Vita Sua*, the most fresh and effective religious autobiography of the 19th century, and perhaps the most fascinating of his many works as it is the most personal. In 1865 he wrote *The Dream of Gerontius*, a poem of marvelous subtlety and pathos. In 1870 he published his *Grammar of Assent*, a book on the philosophy of faith. In the controversies which led to the Vatican Council, Newman sided with the Inopportunists. He was at this time in vehement opposition to the Ultramontanes, and nothing seemed less likely than that Newman should ever become a cardinal; but after the death of Pio Nono and the election of Leo XIII, the policy of the church altered, and the new pope was anxious to show his sympathy with the English Catholic moderates, of whom Dr. Newman was much the most distinguished. Accordingly in 1879 Newman was summoned to Rome to receive the cardinal's hat. For the last eleven years of his life Cardinal Newman seldom broke silence, and his chief contribution to the religious controversy

of the day was an essay intended to suggest that inspiration does not necessarily include mere matters of detail in history, unless these are the nature of facts which lie at the basis of revealed truths, such as the supernatural birth of Christ.

NEWMAN, JOHN P., a bishop of the Methodist Episcopal Church, born in New York City, Sept. 1, 1826, and entered the ministry in 1849. He went to Europe in 1859, and on his return published *From Dan to Beersheba*. In 1869 he became pastor of the Metropolitan Church in Washington, and was chaplain of the Senate for three years. In 1873 he made a tour of the world under appointment of President Grant, and wrote *Thrones and Palaces of Babylon and Nineveh*. He was elected bishop in 1888.

NEW MEXICO, TERRITORY OF. For general article on New Mexico, see *Britannica*, Vol. XVII, pp. 399-402. The census of 1890 reports the area and population as follows: Area, 122,580 square miles; population, 153,593, an increase during the decade of 34,028, or 28.45 per cent. Capital, Santa Fé, with a population of 5,982. Population of Albuquerque, 6,058.

AREA AND POPULATION BY COUNTIES.—The following table shows the land area in square miles and the population of New Mexico by counties in 1890:

Counties.	Area.	Population.	
		1890.	1880.
Bernalillo.....	8,638	20,913	17,225
Chaves.....			
Conchas.....	6,600	7,797	3,388
Doña Ana.....	8,992	9,191	7,912
Eddy.....			
Grant.....	9,300	9,657	4,539
Lincoln.....	26,452	7,081	2,513
Mora.....	4,000	10,618	9,751
Rio Arriba.....	7,150	11,534	11,025
San Juan.....	6,008	1,890	
San Miguel.....	13,246	24,204	20,638
Santa Fé.....	2,293	13,562	10,867
Sierra.....	9,116	8,630	7,875
Socorro.....	15,476	9,595	
Taos.....	2,800	9,868	11,029
Valencia.....	8,900	13,876	13,095

LIST OF GOVERNORS.—The following is a complete list:

James S. Calhoun.....	1851-52	William A. Pile.....	1869-71
William C. Lane.....	1852-53	Marsh Giddings.....	1871-76
Solon Borland.....	1853	Samuel B. Axtell.....	1876-78
David Merriwether.....	1853-57	Lewis Wallace.....	1878-81
Abraham Rencher.....	1857-61	Lionel A. Sheldon.....	1881-85
Henry Conolly.....	1861-65	Edmund G. Ross.....	1885-89
Robert B. Mitchell.....	1865-67	L. Bradford Prince.....	1889-93
William F. M. Army.....	1867-69		

The official term of the governor is four years; salary, \$2,600.

CONDENSED HISTORIC OUTLINE:—This territory was explored by the Spaniards in 1537, who opened mines, established missions, and made some progress in civilizing the natives. In 1846, Santa Fé, the capital, was taken by an American expedition under General Kearney. In 1848 New Mexico was ceded to the United States, and erected into a territory in 1850. The "Gadsdens Purchase" was added in 1853. Arizona was set off in 1863; and part of Colorado in 1865.

Progress of population in New Mexico by decades: In 1850, 61,547; 1860, 93,516; 1870, 91,874; 1880, 119,565; 1890, 153,593.

NEW MILFORD, a beautiful village of Connecticut, on the Housatonic River, fourteen miles north of Danbury. It contains various manufactories and an excellent high-school.

NEWMAN, a village, the county-seat of Coweta county, Ga. It is the seat of important manufactories, and of a seminary known as College Temple. Population in 1890, 2,859.

NEWMHAM COLLEGE, at Cambridge, England, commenced in 1871, when the Newnham Hall Company opened a house for five resident women students Old Hall, Sidgwick Hall, and Clough Hall, now form Newnham College, where, at the present time, 1891, 147 students, under the charge of a principal, two vice-principals, and five lecturers, receive instruction, partly by lectures delivered at Newnham, partly by such lectures of the university and colleges of the university as are open to them. In 1881 the University of Cambridge opened to students of Newnham and Girton its tripos and previous exams., and in 1889, out of thirty-five students of Newnham who entered for the tripos exam., six took a first-class, sixteen a second-class, and nine a third-class; while in 1890 Miss Fawcett was placed above the senior wrangler.

NEW ORLEANS, a city of Louisiana, situated on both sides of the Mississippi River, 107 miles from its mouth. Population in 1890, 241,995. See *Britannica*, Vol. XVII, p. 402.

NEW PHILADELPHIA, a village, the county-seat of Tuscarawas county, Ohio, on the Tuscarawas River, 24 miles south of Massillon. It contains important manufactories and produces abundance of coal and iron.

NEWPORT, a town of England, on the Shrewsbury Canal, 11 miles southwest of Stafford. Chartered by Henry I. and burned in 1665. It has a 15th century church, a grammar-school and manufactories of machinery and agricultural implements. Population, 3,044.

NEWPORT, a town of Fife, on the Firth of Tay, one mile southeast of Dundee. It has a small harbor designed by Telford, and municipal buildings. Population, 2,311.

NEWPORT, the county-seat of Campbell county, Ky., on the Ohio River, opposite Cincinnati. Population in 1890, 24,918. See *Britannica*, Vol. XVII, p. 406.

NEWPORT, a port of entry and one of the capitals of Rhode Island, on the west shore of the Island of Rhode Island, in Narragansett Bay, five miles from the ocean and 69 miles south of Boston. Population in 1890, 19,457. See *Britannica*, Vol. XVII, p. 406.

NEWPORT NEWS, a point of land near the mouth of James River, Va., north of Hampton Roads and about seven miles above Fortress Monroe. It is the terminus of the Chesapeake & Ohio Railroad, and has a fine harbor for the largest sea-going vessels, and a grain elevator of 1,600,000 bushels capacity.

NEWPORT-PAGNELL, a town of England, at the influx of the Ouse to the Ouse, 56 miles northwest of London. Named from the Paganels, who owned the manor in the days of Rufus, it was taken by Essex in 1643, and held two years later by Sir Samuel Luke, the prototype of Butler's "Hudibras." The fine parish church, restored by Street in 1858 is the principal edifice; lace-making has declined. Population of parish, 3,686.

NEW RED SANDSTONE, the name formerly given to the great series of red sandstones which occur between the carboniferous and jurassic systems. The sandstones are now divided into two groups, the lower of which is assigned to the paleozoic and the upper to the mesozoic system.

NEW REPUBLIC, formed in Zululand in 1886-87 by a party of Transvaal Boers, lies on the northern and western side of Zululand, adjacent to the Transvaal and Swaziland. Area 1,380 square miles; population very limited. Capital, Vryheid. On the death of Cetewayo his rule had been usurped by chief Usibeku. Dinizulu, son of Cetewayo, sought and obtained Boer assistance against the usurper, and, as the price of it, ceded territory to the Boers. This they were gradually increasing by various means, when they came into collision with the British authorities, which resulted in negotiation. The new Republic was then defined and delimited, and the remainder of Zululand annexed by Great Britain, including all the coast. See ZULULAND, in these Revisions and Additions.

NEW RICHMOND, a thriving manufacturing village of Ohio, on the Ohio River, about twenty miles above Cincinnati.

NEW RICHMOND, a village of Wisconsin, pleasantly situated on Willow River, about seventeen miles northeast of Hudson.

NEW ROCHELLE, a village of New York, on Long Island Sound, eighteen miles from New York City. It is the site of numerous handsome villas of metropolitan merchants.

NEWSPAPER STATISTICS FOR THE UNITED STATES AND CANADA. For general article on Newspapers see BRITANNICA, Vol. XVII, pp. 412-437. Also see articles on Advertising Journalism in these Revisions and Additions.

The subjoined summaries of Newspaper Statistics are taken from the *American Newspaper Directory* by the kindness and special permission of its publishers, Geo. P. Rowell & Co., of New York City, and bear date April 1, 1891.

The total number of periodical publications now issued in the United States and Canada is 19,373, a net increase during the year of 1,613. In frequency of issue they are divided as follows:

Weekly.....	14,000	Quarterly.....	180
Monthly.....	2,622	Bi-Weekly.....	90
Daily.....	1,791	Bi-Monthly.....	76
Semi-Monthly.....	327	Tri-Weekly.....	46
Semi-Weekly.....	238		
Total.....			19,373

GEOGRAPHICAL DISTRIBUTION.

The geographical distribution of the 19,373 periodicals is as stated below:

New York	1,958	Arkansas	166
Illinois	1,714	Washington	194
Pennsylvania	1,357	Alabama	194
Ohio	1,139	Maine	170
Iowa	878	Louisiana	185
Missouri	849	Mississippi	163
Dominion of Canada	897	North Carolina	162
Kansas	765	West Virginia	142
Indiana	698	Oregon	166
Michigan	690	South Carolina	136
Massachusetts	655	North Dakota	125
Nebraska	610	Florida	122
California	608	Vermont	81
Texas	542	Montana	81
Wisconsin	539	Rhode Island	66
Minnesota	476	District of Columbia	65
New Jersey	353	Utah	51
Virginia	391	New Mexico	47
Kentucky	380	Idaho	46
Colorado	265	Delaware	35
Tennessee	262	Wyoming	35
Virginia	262	Arizona	34
South Dakota	256	Oklahoma	30
Connecticut	207	Nevada	25
North Carolina	207	Indian Territory	18
Maryland	200	Alaska	3
Total			19,373

setts, Vermont and the District of Columbia. Wisconsin remains the same as last year.

New York, Illinois, Pennsylvania, Ohio, Iowa and Missouri each publish more papers than are issued in all of British North America.

The total issue of a single edition of all the publications catalogued is 48,856,500 copies, and the average edition 2,522 copies. the average edition in 1890 was found to be 2,338 copies and 2,034 copies in 1889.

THE SEPARATE GROUPS COUNTED.

The number assigned to each group as follows:

Class.	Description.	Number of Papers in each Class.
1.....	150,000 copies each issue has.....	32 publications.
2.....	100,000	38
3.....	75,000	31
4.....	50,000	60
5.....	37,500	61
6.....	25,000	111
7.....	22,500	63
8.....	20,000	74
9.....	17,500	83
10.....	15,000	84
11.....	12,500	117
12.....	10,000	165
13.....	7,500	275
14.....	5,000	462
15.....	4,000	481
16.....	3,000	563
17.....	2,500	596
18.....	2,000	729
19.....	1,500	1,417
20.....	1,000	2,426
21.....	750	2,501
22.....	500	2,910
23.....	250	2,554
24.....	250	311
25.....	500	3,229
Total.....		19,373

THE SEPARATE GROUPS ARRANGED.

Or, if arranged in accordance with a plan of putting the largest Class first, it is found that—

5,139	publications	are	issuing	500	copies	regularly.
2,865	cc	cc	cc	250	cc	cc
2,501	cc	cc	cc	750	cc	cc
2,436	cc	cc	cc	1,000	cc	cc
1,417	cc	cc	cc	1,500	cc	cc
1,329	cc	cc	cc	2,000	cc	cc
596	cc	cc	cc	2,500	cc	cc
563	cc	cc	cc	3,000	cc	cc
481	cc	cc	cc	4,000	cc	cc
462	cc	cc	cc	5,000	cc	cc
275	cc	cc	cc	7,500	cc	cc
165	cc	cc	cc	10,000	cc	cc
117	cc	cc	cc	12,500	cc	cc
111	cc	cc	cc	25,000	cc	cc
84	cc	cc	cc	15,000	cc	cc
83	cc	cc	cc	17,500	cc	cc
74	cc	cc	cc	20,000	cc	cc
63	cc	cc	cc	22,500	cc	cc
61	cc	cc	cc	37,500	cc	cc
60	cc	cc	cc	50,000	cc	cc
38	cc	cc	cc	100,000	cc	cc
32	cc	cc	cc	150,000	cc	cc
81	cc	cc	cc	75,000	cc	cc

19,373—Total.

It will be observed that out of a total number of 19,373 publications 11,505, or nearly two-thirds of the whole, are rated as having an average issue of less than 1,000 copies. Of this multitude of small newspapers, nearly one-half are issued on what is known as the co-operative plan: a sheet already printed on one side being furnished from a central office, and upon the blank side of this the publisher prints the local matter which is expected and required of the home paper. Some of these papers have weekly issues running up into thousands, and it is an undisputed fact that the plan makes possible a local newspaper of considerable excellence.

The States which do not show an increase in the number of papers published are Kansas, Massachu-

in communities which would not otherwise be able to supply sufficient patronage to support a publication wholly manufactured at home.

EXCEEDING ONE HUNDRED THOUSAND.

The number of periodicals rated as issuing regularly more than one hundred thousand copies is larger by fifteen than in the last previous issue of the *Directory*. The following is a complete catalogue of them:

New Haven, Conn.,	Household Pilot.
Washington, D. C.,	National Tribune.
	Home Magazine.
Atlanta, Ga.,	Constitution (Weekly edition).
Chicago, Ill.,	Inter-Ocean (Weekly edition).
"	News (Daily edition).
"	Saturday Blade.
Augusta, Me.,	World Wide Missions.
"	Vickery's Fireside Visitor.
"	Comfort.
"	Daughters of America.
"	Golden Moments.
"	Sunshine.
Portland, Me.,	Practical Housekeeper and Ladies' Fireside Companion.
Boston, Mass.,	Globe (Daily edition).
"	Globe (Sunday edition).
"	Herald (Daily edition).
"	Herald (Sunday edition).
"	Yankee Blade.
"	Youth's Companion.
Lynn, Mass.,	Home Cheer.
Springfield, Mass.,	Farm and Home.
Detroit, Mich.,	Free Press (Weekly edition).
Minneapolis, Minn.,	Housekeeper.
St. Louis, Mo.,	Hustler.
Elmira, N. Y.,	Telegram.
New York, N. Y.,	Morning Journal (Daily edition).
"	News (Daily edition).
"	Sun (Daily).
"	Sun (Sunday edition).
"	World (Morning).
"	World (Evening).
"	World (Sunday).
"	World (Weekly edition).
"	Catholic News.
"	Family Story Paper.
"	Fireside Companion.
"	National Police Gazette.
"	Sunday Mercury.
"	Once a Week.
"	Puck.
"	Voice.
"	Weekly.
"	American Agriculturist.
"	Century Magazine.
"	Delineator.
"	Harper's New Magazine.
"	Housewife.
"	Ladies' World.
"	Metropolitan.
"	People's Home Journal.
"	Sunday School Journal.
Rochester, N. Y.,	American Rural Home.
Utica, N. Y.,	Saturday Globe.
Springfield, O.,	Farm and Fireside.
"	Ladies' Home Companion.
Toledo, O.,	Blade (Weekly edition).
Harrisburg, Pa.,	Telegram.
Philadelphia, Pa.,	Evening Item (Daily edition).
"	Item (Sunday edition).
"	Record (Daily edition).
"	Golden Days.
"	Saturday Night.
"	Sunday School Times.
"	Farm Journal.
"	Ladies' Home Journal.
"	Lippincott's Magazine.
"	Munyon's Magazine.
"	Advanced Quarterly.
"	Scholars' Quarterly.

NEWTON, a city of Massachusetts, seven miles southwest of Boston. It contains many suburban residences belonging to citizens of Boston, and has manufactories of cloth, silk, shoddy, machinery, and glue. Population in 1890, 24,379.

NEWTON, a village, the county-seat of Jasper county, Iowa. It is the center of a coal-producing and agricultural region, and has excellent educational advantages. Population in 1890, 2,563.

NEWTON, the county-seat of Harvey county Kan., 134 miles southwest of Topeka. It is the center of a rich coal-field. Population in 1890, 5,602.

NEWTON, a village, the county-seat of Sussex county, N. J., about twenty-five miles northwest of Morristown. It is an important manufacturing town and the trade-center of a rich mining and agricultural district.

NEWTON, CHARLES THOMAS, an English archaeologist, born at Bredwardine, Wales, in 1816. He was assistant curator of antiquities in the British Museum from 1840 to 1852. In the latter year he was made vice-consul at Mitylene. While holding this office he explored the islands and coasts of the Grecian Archipelago; discovered in 1856 the mausoleum at Halicarnassus; and made extensive excavations at Cnydus and Branchidae. In 1860 he became consul at Rome; and in 1861 he was made keeper of the Greek and Roman antiquities in the British Museum. In 1880 he was appointed professor of archaeology in the University College, London. He has published *History of the Discoveries at Halicarnassus, Cnydus, and Branchidae; Travels and Discoveries in the Levant; and Essays on Art and Archaeology* (1880); also guide-books to the collections in the British Museum.

NEWTON, JOHN, engineer and general, born at Norfolk, Va., in 1823. He graduated at West Point in 1842, being second in the class; and served afterwards as assistant professor of engineering there. In 1861 he had charge of a brigade and commanded the defenses of Washington. In the Peninsular campaign he was engaged in the actions at West Point, Gains' Mills, and Glendale, and afterwards at South Mountain and Antietam. At Fredericksburg he commanded a division, and was soon after promoted major-general. He took part in the battles of Chancellorsville, Salem Heights and Gettysburg (1863), and in 1864 in the capture of Atlanta. After the war he returned to the engineer corps of the regular army. The important work conducted by Gen. Newton after the war was the removal of the obstructions at Hellgate and other points on the East River (See HELL GATE IMPROVEMENTS in these Revisions and Additions). In 1887 Mayor W. R. Grace of New York, appointed him commissioner of public works in New York City, which office he also held during Mayor Hewitt's administration.

NEWTON, THOMAS, an English divine, born at Lichfield, Jan. 1, 1704, died Feb. 14, 1782. From Westminster he passed to Trinity College, Cambridge, became one of its fellows, took orders, and after minor preferments was made bishop of Bristol and canon residentiary of St. Paul's in 1761. Newton's annotated edition of Milton's *Paradise Lost and Paradise Regained*, and his *Dissertations on the Prophecies* long enjoyed a reputation far beyond their deserts.

NEWTON HEATH, a town and local government district, and part of the parliamentary borough of Manchester, England. Population, 29,189.

NEW ULM, a city, the county-seat of Brown county, Minn., on the Minnesota River, thirty miles west of St. Peter. It contains a nunnery and several manufactories. Population in 1890, 3,741.

NEW WESTMINSTER, formerly the capital of British Columbia, is on the north bank of the Fraser River, ten miles from its mouth and 113 miles northeast of Vancouver Island. Here are a penitentiary and a lunatic asylum, saw-mills, and great salmon-canning establishments. Population, 2,700.

NEW YORK BAY TUNNEL, a proposed railway tunnel under New York Bay, connecting Staten Island and Long Island, so as to give the

lines on the New Jersey shore a Brooklyn terminus. The tunnel would be two and one-half miles long, but the length of the new railway would be altogether six miles. Running across Staten Island from Arthur Kill bridge to Stapleton, about a mile from the latter point tunnelling would begin; the point of egress would be near Bay Ridge; then going across Gowanus Bay the line would continue to Fulton Ferry, near the termini of nearly all the surface and elevated railroads, and thence to the projected East River tunnel. The total cost, it is estimated, will be less than \$6,000,000.

NEW YORK, CITY OF. For general article of the City of New York, see Britannica, Vol. XVII, pp. 457-466. As the record in the Britannica is very full, presenting the city in nearly all its salient points, it only required that we here supplement with a few additional items.

LATER CENSUS FIGURES.—The population of the city as returned by the United States census of 1890 was 1,513,501, covering an area of 40 square miles. The following table shows the comparative progress of the city in population by decades:

	Population.	Increase.
1790	83,131	
1800	60,515	27,584
1810	96,372	35,858
1820	128,706	27,333
1830	202,589	78,872
1840	312,710	110,124
1850	515,547	202,837
1860	819,899	304,352
1870	942,292	122,393
1880	1,206,299	264,007
1890	1,513,501	307,202

POPULATION OF NEW YORK CITY COMPARED WITH THAT OF LONDON.—In order to get a comparison of the population of the City of New York and its environs with the population of "the Greater London" (see LONDON, in these Revisions and Additions), the following official figures, taken from the census returns of 1890, have been collated. They embrace very nearly the area covered by the accompanying map of the vicinity of New York:

	1890.	1880.	Increase.
Monmouth county, N. J.	60,128	55,538	13,600
Bergen county, N. J.	47,286	36,786	10,440
Middlesex county, N. J.	61,754	52,286	9,468
Union county, N. J.	72,467	55,571	16,896
Essex county, N. J.	256,098	189,928	66,169
Passaic county, N. J.	105,046	68,860	36,186
Hudson county, N. J.	275,126	187,944	87,182
Richmond county, N. Y.	51,693	38,991	12,702
Queens county, N. Y.	123,059	90,574	37,485
Westchester county, N. Y.	146,772	108,988	37,784
Kings county, N. Y.	888,547	599,495	289,052
New York county	1,513,501	1,206,299	307,202
Total	3,565,417	2,691,261	870,956

The latest published total population in "London proper" (official estimates for 1889) showed a total of 4,351,738; excess over the "Greater New York," of 786,321. Age of New York, about 277 years. Age of London, over 2,000 years.

MAYOR'S OF NEW YORK CITY.

Thomas Willet	1665	Richard Varick	1789-1801
Thomas Delavall	1666	Edward Livingston	1801-3
Thomas Willet	1667	De Witt Clinton	1803-7
Cornelius Steenwyck	1668-70	Marius Willet	1807-8
Thomas Delavall	1671	De Witt Clinton	1808-10
Matthias Nicoll	1672	Jacob Radcliff	1810-11
John Lawrence	1673	De Witt Clinton	1811-15
Matthias Nicoll	1674	John Ferguson	1815
William Darvall	1675	Jacob Radcliff	1815-18
Nicholas D. Meyer	1676	Cadwalader D. Colden	1818-21
Stevanus Van Cortlandt	1677	Stephen Allen	1821-24
Thomas Delavall	1678	William Paulding	1824-26
Francis Rombouts	1679	Philip Hone	1826-27
William Dyer	1680-81	William Paulding	1827-29
Cornelius Steenwyck	1682-83	Walter Bowne	1829-33
Gabriel Minvielle	1684	Guido Lee	1833-34

Nicholas Bayard	1685	Cornelius W. Lawrence	1834-37
Stevanus Van Cortlandt	1686-87	Aaron Clark	1837-39
Cornelius Steenwyck	1688	Isaac L. Varian	1839-41
Peter Delancy	1688-90	Robert H. Morris	1841-44
John Lawrence	1691	James Harter	1844-45
Abraham De Peyster	1691-94	Wm. F. Havemeyer	1845-46
Charles Lodowick	1694	Andrew H. Mickle	1846-47
William Merrit	1695-98	William F. Brady	1847-48
Johannes De Peyster	1698-99	William F. Havemeyer	1848-49
David Provost	1699-1700	Caleb S. Woodhull	1849-51
Isaac de Knecht	1700-1	Ambrose C. Kingsland	1851-53
Thomas Neell	1701-2	Jacob A. Wastervelt	1853-55
Philip French	1702-3	Fernando Wood	1855-56
William Peartree	1703-7	Daniel N. Tiemann	1856-59
Ebenezer Wilson	1707-10	Fernando Wood	1860-62
Jacobus Van Cortlandt	1710-11	George Opdyke	1862-64
John Heathcote	1711-14	C. Godfrey Gunther	1864-66
John Johnson	1714-19	John T. Hoffman	1866-68
Jacobus Van Cortlandt	1719-20	Thomas Coman (acting)	1868-69
Robert Walters	1720-25	A. Oakley Hall	1869-73
Johannes Jansen	1725-27	William F. Havemeyer	1873-75
Robert Lutting	1727-35	William H. Wickham	1875-77
Paul Richards	1735-39	Smith Ely	1877-79
John Cruger	1739-44	Edward Cooper	1879-81
Stephen Bayard	1744-47	William R. Grace	1881-83
Edward Holland	1747-57	Frank A. Vanderlip	1883-85
John Cruger	1757-66	William R. Grace	1885-87
Whitehead Hicks	1766-76	Abram S. Hewitt	1887-89
David Matthews (Tory)	1776-84	Hugh J. Grant	1889-90
James Duane	1784-89		

FINANCIAL CONDITION, JAN. 1, 1891.—The following facts and figures are given in the message of Mayor Grant to the Board of Aldermen, Jan. 5, 1891:

Total funded debt of the city Dec. 31, 1889, \$144,301,215.42; total funded debt Dec. 31, 1890, \$146,371,922.88; total net debt after deducting amount held by commissioners of Sinking Fund—investments (\$41,010,120.50), and the amount of cash on hand (\$4,627,521.15), including revenue bonds \$98,064,418.07.

Among the items of indebtedness incurred during the previous year (1890) for permanent improvements were the issue of \$2,500,000 of bonds issued for the completion of the New Croton Aqueduct. That great work had cost the City of New York the sum of \$24,767,477.25, and was a completed fact July 15, 1890, when the gates were opened and the water from the New Aqueduct flowed into the reservoirs in Central Park, increasing the water supply of the city from one hundred and ten million gallons to one hundred and fifty-five million gallons per day, and giving to the city "a more beautiful and more healthful supply of water than that enjoyed by any other city in the world." *

The New Aqueduct was commenced in 1883. At the time this work was commenced the facilities for supplying water to the City of New York did not exceed 98,000,000 gallons per day.

Under authority from the State legislature the city government was engaged in spending \$1,000,000 annually for three years, in improving the pavements of the streets.

The corner-stone of the new criminal court-house was laid Oct. 25, 1890, and satisfactory progress was being made in the erection of the building. The contract required its completion within five hundred days from Feb. 28, 1890, at a cost of \$1,277,700.

During the year 1890, there were laid 86,500 feet of water-mains, and 32,000 feet of sewers. More than 700,000 square yards of new asphalt pavement were laid; 33½ miles of streets were paved, and the Mayor reported that there were then in the city 320,000 more square yards of such pavement than there were either in Paris or London.

The City Department had, during the last year greatly extended the system of free baths, so that during the year 2,794,934 males and 1,239,645

* Quoted from the Mayor's Message.

females had enjoyed the use of such baths. During 1890 plans had been approved for the construction of new buildings costing an aggregate of \$81,597,000. The police force embraces a total of 3,546 men.

The appropriations had been made for educational purposes. There were then in the city 228 public schools, with 153,357 pupils, and 3,509 teachers. The manual training schools numbered 37, with 430 teachers and 20,000 pupils of whom 900 were taking lessons in special courses in cooking, and 5,700 in sewing. There were in the evening schools 31,075 pupils.

The Board of Electrical Control during the past year had constructed, for the reception of telegraph and telephone conductors, 178 miles of single duct in 9 miles of street trench, making a total construction of telephone and telegraph subways of 697 miles of duct in 88 miles of street trench. There had been constructed 132 miles of duct in 39 miles of street trench for electric-light conductors, making for electric-light service constructed up to date 647 miles of duct in 85 miles of street trench. There had been placed in the subways 10,150 miles of telephone and telegraph wire and 340 miles of wire for electric-light service, making in all now in the subways, telephone, telegraph and electric-light wires, 23,707 miles. There had been removed during the year 1,361 poles and 18,949,645 feet of overhead wires.

The number of people cared for by the Commissioners of Public Charities and Correction in the different departments during the past year was as follows: Aided by the out-door Poor Relief, 59,103; supported in the Department, 48,706; making a total of relieved and supported poor of 98,102.

CHRONOLOGICAL HISTORIC OUTLINE:

A Dutch colony arrived and founded the settlement of New Amsterdam on the site of the present Bowling Green, where they built a fort	1614
It contained about 1,000 inhabitants.	1648
It was surrendered to the British, when the name New Amsterdam was changed to that of New York, in honor of James Duke of York, brother of Charles II.	1664
The city contained about 384 houses.	1664
Trinity church was founded	1696
The population had increased to about 6,000.	1700
A slave-market was opened in Wall street.	1711
The "New York Gazette" was founded.	1725
A city library was founded.	1729
The New York Society Library was organized.	1730
A theater was established.	1730
King's (now Columbia) College was chartered.	1754
The Sandy Hook light-house was first lighted.	1763
The famous Congress, known as the Stamp Act Congress, assembled in the city, and the Sons of Liberty were organized.	1765
The effigies of Governor Colden and the devil holding the Stamp Act were burned on the Bowling Green.	1765
Nov. 1.	1765
The Chamber of Commerce was organized.	1768
The Colonial Assembly adjourned, and delegates were elected to the Continental Congress.	1775
A body of militia took possession of the city in January, and was followed by the American army in the spring of.	1776
The Declaration of Independence was read to the army July 8.	1776



After the battle of Long Island the city fell into the hands of the British.	Aug. 26, 1776
A destructive fire consumed an eighth of its buildings.	Dec. 21, 1776
The British evacuated the city, and Washington entered it at the head of the American army.	Nov. 25, 1783
Congress removed from Philadelphia to New York, and met in the City Hall, corner of Wall and Nassau streets, now the site of the United States Sub-Treasury.	Jan. 1785
The Bank of New York was organized.	1785
The new Constitution of the United States was adopted by the Legislature, and celebrated by a procession in the city.	July 26, 1788
Gen. Washington was inaugurated President of the United States on the gallery front of the old City Hall, facing Broad street.	April 30, 1789
The Park Theater was erected.	1795
The Manhattan Co. was chartered to supply the city with water.	1799
The City Hall was erected.	1803-12
Hackney coaches were first licensed.	1804
The New York Free School was incorporated, and also the Tammany Society.	1805
Steam navigation was first successfully inaugurated on the Hudson River by Robert Fulton.	1806
The city was surveyed and laid out.	1807
On the declaration of war against Great Britain, a large number of privateers left the city, and became the terror of the British traders till peace was declared.	1812
The first steam ferry was established to Jersey City.	1812
The first news of the treaty of peace was received at New York with enthusiasm.	Feb. 12, 1815
The House of Refuge was established.	1824
General La Fayette arrived in the city and was received with great rejoicing.	Aug. 15, 1824
Gas was first introduced and mains laid in Broadway.	1825
The Erie Canal was completed, uniting the lakes with the Atlantic.	1826
The Asiatic cholera ravaged the city.	1832
First horse railroad in the world opened on Fourth Avenue.	1832
The city was visited by a terrible fire, which destroyed 600 buildings and over \$20,000,000 of property.	1835
Business panic and suspension of specie payments by banks.	1837

The great Croton Aqueduct was completed	1842
The great influx of immigrants commenced	1844
Another dreadful fire destroyed millions' worth of property	1845
An international exhibition was opened in the Crystal Palace, an edifice of great beauty, but soon destroyed by fire	July, 1853
The site of Central Park was selected by commissioners appointed by the Supreme Court	July, 1855
The great business panic which affected both hemispheres was severely felt in the city	1856
The successful laying of the Atlantic cable was celebrated by a great public demonstration	1858
The Japanese Embassy and the Prince of Wales visit the city	1860
The attack on Fort Sumter aroused the American spirit, and led to an immense meeting on Union square in support of the North, the effects of which were instantly felt throughout the country at large, New York throwing herself heart and soul in the work of suppressing the revolt	1861
Draft riots	1863
During the war the city furnished 116,382 troops to the government	1861-64
The body of President Lincoln, on its way to the West, lay in state in the City Hall where it was visited by the populace	1865
"Black Friday" panic	Sept. 24, 1869
Exposure of the Freed Ring frauds	1871
A disastrous business panic paralyzes the city, and forces several great corporations into bankruptcy	1873
Tweed sentenced to imprisonment	Nov. 19, 1873
Hell Gate reefs blown up (Hallett's Point)	Sept. 24, 1876
Elevated railroads in operation	1877-78
The erection in Central Park of the famous Cleopatra's Needle, presented to the United States by the Khedive of Egypt	1883
The New York Produce Exchange was opened	1884
The New Cotton Exchange	1885
General and ex-President Grant having died at the summer cottage of Mr. Drexel, on Mt. McGregor, July 23, 1885, the obsequies were held in New York, and the body was deposited in Riverside Park, New York. The funeral procession and the memorial display were the greatest ever witnessed in America. Aug. 8, 1885	
The Washington Centennial celebration was held, in which President Harrison and a multitude of the leading officials of the National and State governments participated, with the greatest military display, with the largest attendance of spectators ever witnessed in the city	April 29-May 1, 1889
The great work of building the New Croton Aqueduct begun in 1883 and constructed at a cost of \$24,767,477.35, was announced as completed	July 15, 1890

NEW YORK CITY, UNIVERSITY OF. See COLLEGES in these Revisions and Additions. This university has three departments or faculties:

1. *The faculty of arts and science*, whose work is carried on in a large building on Washington square, east, extending from Washington Place to Waverly Place.

2. *The department of medicine*, commonly known as the "University Medical College." Its work is carried on in a building on East Twenty-Sixth street, fronting the Bellevue Hospital square.

3. *The department of law* in the university, commonly called the "University Law School." The lecture and library rooms of this school are in the main university building.

NEW YORK, STATE OF. For general article on the State of New York, see *Britannica*, Vol. XVII, pp. 450-466. The census of 1890 reports the area and population as follows: Area, 49,170 square miles; population, 5,997,853, a gain during the decade of 914,982. Capital, Albany, with a population of 93,523.

GOVERNORS OF NEW YORK.—The following is a complete list of the governors of New York with the dates of their official service:

UNDER THE DUTCH.

Peter Minuet	1624-33	William Kieft	1637-47
Wouter van Twiller	1639-37	Petrus Stuyvesant	1647-64

UNDER THE ENGLISH.

Richard Nicolls	1664-67	Francis Lovelace	1667-73
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DUTCH ADMINISTRATION RESUMED.

Anthony Colve, 1673-74

ENGLISH ADMINISTRATION RESUMED.

Edmond Andros	1674-83	William Burnet	1720-23
Thomas Dongan	1683-88	John Montgomerie	1728-31
Edmond Andros	1688-89	Rip van Dam	1731-32
Jacob Leisler	1689-91	William Cosby	1732-36
Henry Sloughter	1691	George Clarke	1736-43
Richard Ingolsby	1691-92	George Clinton	1743-53
Benjamin Fletcher	1692-93	Sir Danvers Osborne	1753
Richard, Earl Bellemont	1698-1701	James de Lancy	1753-55
John Nanfan	1701-2	Sir Charles Hardy	1755-57
John Cornbury	1702-8	James de Lancy	1757-60
John, Lord Lovelace	1708-9	Cadwallader Colden	1760-61
Richard Ingolsby	1709-10	Robert Markton	1761
Gerardus Beckman	1710	Cadwallader Colden	1761-65
Robert Hunter	1710-19	Sir Henry Moore	1765-69
Peter Schuyler	1719-20	Cadwallader Colden	1769-70
William Tryon	1771-77	John, Lord Dummore	1770-71

GOVERNORS OF THE STATE.

George Clinton	1777-95	John Young	1846-49
John Jay	1795-1801	Hamilton Fish	1849-51
George Clinton	1801-4	Washington Hunt	1851-53
Morgan Lewis	1804-7	Horatio Seymour	1853-55
Daniel D. Tompkins	1807-17	Myron H. Clark	1855-57
De Witt Clinton	1817-22	John A. King	1857-59
Joseph C. Yates	1822-21	Edwin D. Morgan	1859-63
De Witt Clinton	1824-28	Horatio Seymour	1863-65
Nathaniel Pitcher	1828-29	Reuben E. Fenton	1865-69
Martin Van Buren	1829	John T. Hoffman	1869-73
Enos T. Throop	1829-33	John Adams Dix	1873-75
William L. Marcy	1833-38	Samuel J. Tilden	1875-77
William H. Seward	1838-42	Lucius B. Robinson	1877-80
William C. Bouck	1842-44	Alonzo B. Cornell	1880-83
Silas Wright, Jr.	1844-46	Grover Cleveland	1883-85
David B. Hill	1885-92		

Governor Hill's official term expires Jan. 1, 1892. Salary of the governor, \$10,000.

The following table gives the population of the cities and towns which in 1890 had each more than 8,000 inhabitants; also the population of each in 1880, and the increase during the decade.

Towns and Cities.	Population.		Increase.	Per cent.
	1890.	1880.		
Albany	94,923	90,758	4,165	4.59
Amsterdam	17,336	9,446	7,890	83.14
Albany	25,858	21,942	3,916	17.94
Binghamton	35,005	17,688	17,317	102.14
Brooklyn	806,343	566,663	239,680	42.39
Buffalo	255,664	155,134	100,530	64.80
Cohoes	22,509	19,416	3,093	15.93
Corning	8,550	4,802	3,748	78.05
Dunkirk	9,116	7,248	1,868	29.91
Elmira	29,708	20,541	9,167	44.63
Flushing	10,863	6,683	4,185	62.62
Gloversville	13,864	7,133	6,731	94.36
Hornellsville	10,996	8,195	2,801	34.18
Hudson	9,970	8,670	1,300	14.99
Ithaca	11,079	9,105	1,974	21.68
Jamestown	16,088	9,257	6,831	71.40
Kingston	21,261	18,344	2,917	15.90
Lansingburg	10,550	7,432	3,118	41.95
Little Falls	8,783	6,910	1,873	27.11
Lockport	16,038	13,522	2,516	18.61
Long Island City	30,506	17,129	13,377	78.10
Middletown	11,977	8,494	3,483	41.01
Mt. Vernon	10,677	4,586	6,091	132.82
New Brighton	16,423	12,679	3,744	29.53
Neuburg	23,087	18,049	5,038	27.91
New Rochelle	8,318	5,276	3,042	57.66
New York	1,515,301	1,206,239	309,062	25.62
Ogdensburg	11,662	10,341	1,321	12.77
Oswego	21,842	21,116	726	3.44
Peekskill	9,676	6,893	2,783	40.37
Port Jarvis	9,327	8,678	649	7.48
Poughkeepsie	22,206	20,207	1,999	9.89
Rochester	153,896	99,355	54,541	54.93
Rome	14,991	12,134	2,797	23.04
Saratoga Springs	11,976	8,421	3,554	42.20
Scenectady	19,902	13,655	6,247	45.75
Sing Sing	9,352	6,578	2,774	42.17
Syracuse	88,143	51,792	36,351	70.19
Troy	60,856	56,747	4,109	7.42
Utica	44,007	33,914	10,093	29.76
Watertown	14,725	10,697	4,028	37.66

AREA AND POPULATION BY COUNTIES.—The land area in square miles and the population of the State by counties in 1890 were as follows:

Counties.	Area.	Population.	
		1890.	1880.
Albany.....	499	164,555	154,890
Allegany.....	1,060	48,240	41,810
Broom's.....	685	62,973	49,488
Cattaraugus.....	1,366	80,866	55,806
Cayuga.....	773	65,302	65,081
Chautauqua.....	1,020	75,202	65,342
Chemung.....	436	48,265	43,065
Clinton.....	854	37,776	39,891
Columbia.....	691	46,437	50,897
.....	691	46,172	47,928
Cortland.....	480	28,057	25,825
Delaware.....	1,557	45,496	42,721
Dutchess.....	853	77,879	79,184
Eric.....	996	322,981	219,484
Essex.....	1,667	38,052	34,515
Franklin.....	1,753	38,110	32,390
Fulton.....	567	37,650	30,985
Genesee.....	497	33,265	32,806
Greene.....	660	31,598	32,635
Hamilton.....	1,767	4,762	3,923
Herkimer.....	1,459	45,608	42,669
Jefferson.....	1,147	68,806	66,103
Kings.....	37	838,547	599,495
Lewis.....	1,294	29,806	31,415
Livingston.....	644	37,801	39,562
Madison.....	628	42,892	44,112
Monroe.....	721	189,586	144,903
Montgomery.....	396	45,699	38,315
New York.....	40	1,515,301	1,206,299
Niagara.....	504	62,491	54,173
Oneida.....	1,196	122,922	115,475
Onondaga.....	824	446,247	117,893
Ontario.....	674	48,453	49,541
Orange.....	791	97,859	88,220
Orleans.....	399	30,803	30,128
Oswego.....	962	71,883	77,911
Otsego.....	956	50,861	51,397
Putnam.....	241	14,849	15,181
Queens.....	250	128,059	90,574
Rensselaer.....	648	124,511	115,328
Richmond.....	61	51,693	38,991
Rockland.....	200	35,162	27,690
Saint Lawrence.....	2,926	85,048	85,997
Saratoga.....	800	57,663	55,156
Schenectady.....	800	29,797	25,538
Schoharie.....	647	29,164	32,910
Schuyler.....	335	16,711	18,842
Seneca.....	316	28,227	29,278
Steuben.....	1,490	81,473	77,586
Suffolk.....	720	62,491	58,888
Sullivan.....	911	31,031	38,421
Tioga.....	498	29,835	32,673
Tompkins.....	494	32,923	34,445
Ulster.....	1,157	87,062	85,833
Warren.....	940	27,866	26,179
Washington.....	861	45,690	47,671
Wayne.....	621	49,729	51,700
Westchester.....	463	146,772	108,388
Wyoming.....	606	31,193	30,907
Yates.....	342	21,001	21,087

CONDENSED HISTORIC OUTLINE.—New York was first discovered by Verrazano, a Florentine in the French service about 1524. It was re-discovered by Henry Hudson, an Englishman, in the Dutch service, in 1609. The Dutch made settlements on Manhattan Island in 1614-21. The first agricultural settlement was made by the Dutch at Albany in 1623. The whole of Manhattan Island was purchased by Peter Minuet (Dutchman) for \$24 in 1626. The English, under Nichols, dispossessed the Dutch

and Swedes in 1664. Charles II. granted the lands between the Hudson and Delaware rivers to the Duke of York, in 1664. French-Indian wars began in 1687. Sir Wm. Johnston's victory at Lake George took place in 1687. Oswego was taken by the French in 1755. Oswego was taken by the French in 1756. Fort Henry (Lake George) was taken by the French in 1757. Abercrombie was defeated by the French at Ticonderoga in 1758. After several defeats at Niagara, Ticonderoga and other points, the French were driven from the country in 1760. The first State constitution was adopted in 1777. Albany was made the capital in 1797. The articles of Confederation for the States were adopted by the legislature of New York in 1778, and the constitution was approved July 26, 1788. The Erie and Champlain canals were commenced in 1817, the latter was completed in 1823, and the former in 1825. PROGRESS OF POPULATION BY DECADES.—In 1790, 340,120; 1800, 589,051; 1810, 959,049; 1820, 1,372,111; 1830, 1,918,608; 1840, 2,428,921; 1850, 3,097,394; 1860, 3,880,785; 1870, 4,382,759; 1880, 5,082,871; 1890, 5,997,853.

For numerous other items of interest relating to the State of New York, see the article UNITED STATES, in these Revisions and Additions.

NEW ZEALAND. For the general article on New Zealand, see Britannica, Vol. XVII, pp. 466-71. The latest reports make the area 10,447 square miles.

The North Island is estimated to embrace an area of 44,467 square miles, the Middle Island 58,525, while Stewart's Island has an area of 665 square miles. New Zealand was officially established as a colony in 1840. The total acreage of the colony is 66,861,440, and up to the end of 1888, 19,244,344 acres had been alienated from the crown.

The total population, exclusive of aborigines, in 1886, the date of the census returns, was 578,482, an increase since 1858 of 518,068, and an increase during the last five years of 88,549. The areas and populations of the provincial districts severally in 1888, were as follows:

Provincial District.	Square Miles.	Population.
Auckland.....	25,746	130,379
Taranaki.....	3,308	17,999
Wellington.....	11,003	77,536
Hawke's Bay.....	4,410	24,588
Marlborough.....	4,753	11,113
Nelson.....	10,269	30,203
Westland.....	4,641	15,931
Canterbury.....	14,040	121,400
Otago.....	25,487	149,154

The population of the North Island was 250,482; of the South Island, including Stewart's Island, 327,801. In 1876, New Zealand, previously divided into ten provinces, was divided into counties and boroughs. The census of 1886 gave the total population as 620,451, including 41,969 Maoris. The total included 4,542 Chinese, of whom only 15 were females.

Of the Maoris, 22,840 were males; and 19,129 females. The total number includes 2,254 half-caste, living as members of Maori tribes, and 201 Maori wives of European husbands.

At the census of 1886 there were four towns with over 10,000 inhabitants in New Zealand—namely, Auckland, 33,161, or with suburbs, 57,048; Wellington (the seat of government), 25,945, or with suburbs, 27,833; Christchurch, 15,265, or with suburbs, 44,688; and Dunedin, 23,243, or with suburbs, 45,518 inhabitants. All the towns showed a large

increase in population between the enumerations of 1874 and 1886.

GOVERNMENT.—The provincial system was abolished in 1875, and the powers previously exercised by superintendents and provincial officers have since been exercised by the governor or by local boards. By the terms of later amending statutes, the legislative power is now vested in the governor and a "general assembly" consisting of two chambers—the first called the legislative council, and the second the house of representatives. The governor has the power of assenting to or withholding consent from bills, or can reserve them for her majesty's pleasure. He summons, prorogues, and dissolves the parliament. He can send drafts of bills to either house for consideration, but in case of appropriations of public money must first recommend the house of representatives to make provision accordingly before any appropriations can become law. He can return bills for amendment to either house.

The legislative council consists of forty-five members, nominated by the crown for life. By an act passed in 1887, the number of members to be elected to the house of representatives was reduced to seventy-four, including four Maoris, elected by the people for three years. The qualifications of electors are as follows: (a) Residence in the colony and electoral district for six months immediately preceding registration, in case of European males 21 years of age and upwards; (b) possessors of a freehold estate of the value of 25*l.*; (c) every male Maori 21 years of age or over, whose name is on a ratepayers' roll, or who has a freehold estate of the value of 25*l.*

The general administration rests with a responsible ministry of seven members. The governor, appointed by Great Britain, receives a salary of \$25,000.

FINANCE AND DEFENSE.—The value of the imports in 1889 was estimated at £6,297,097; the exports at £9,339,265. The total revenues in that year aggregated £3,991,919; the expenditures, £3,962,912.

During the last few years the first consideration has been to provide sufficient means of protection for the principal ports of the colony. The approaches thereto are now defended by batteries of heavy ordnance, supplemented by torpedo-boats and submarine mines.

The volunteer force has a strength of 10,063 of all ranks. There is besides a permanent militia, consisting of an artillery branch of 137 officers and men. Torpedo branch 54. The police force numbers 498. All males from 17 to 55 years of age are liable to serve in the militia. It has been estimated that in 1887 there would have been 153,386 persons at ages liable to be called upon for this service.

Only a small part of the imports are admitted free of duty. Luxuries, as spirits, wine, and tobacco are highly rated. Clothing and most articles of general merchandise pay from 25 to 15 per cent. *ad valorem*.

In 1890 there were open 1,912 miles of railway. The telephone system was in general use.

NEZ PERCÉS, a tribe of Indians, see **INDIANS**, **NORTH AMERICAN**, in these Revisions and Additions.

The name of *Nez Percés* means "pierced noses." There is no custom among these Indians to justify such a name. They flatten the heads of their children.

NIAGARA, a river and waterfall, see **BRITANNICA**, Vol. XVII, p. 472.

NIAGARA, a town of Ontario, popular as a summer-resort, situated on Lake Ontario, at the mouth of the river Niagara, fifteen miles from the falls. Niagara (then Newark) was burned down in De-

cember, 1813, by the American General M'Clure on his retreat. Population, 1,441.

NIAGARA FALLS, a village of New York, the principal place in the neighborhood of the falls. Population, 3,320. See **BRITANNICA**, Vol. XVII, p. 473.

NIAGARA FALLS RESERVATION. For some years prior to 1885 efforts were made by public spirited persons to have the approaches to Niagara Falls on the American side made the property of the State and free of access to all. Private interests of various kinds stood in the way of this project, and numberless petty extortions were practiced on the public. The legislature of 1884 passed a measure constituting a State commission for the appraisal and condemnation of the structures obstructing the bank of the river, which commission was also empowered to police the reservation when control should be obtained. July 15, 1885, was the day set for the final abolishment of the fee-system and of the various hotels and shanties; and on that date the Niagara Falls Reservation, sometimes called the Niagara State Park, measuring 107 acres, at a cost to the State of \$1,433,430, passed into the keeping of the representatives of the people forever. A similar reservation, known as the Queen Victoria Niagara Falls Park, embracing about 150 acres, was authorized by the legislature of Ontario, and was opened to the public June 22, 1887.

NIAGARA WATER POWER. The water power of Niagara Falls has long claimed the attention of engineers and capitalists. In 1890 an American association broke sod in pursuance of a scheme to erect machinery for collecting and distributing the power, and to transmit it to distant places. The plan, as detailed, includes the building of a main tunnel of 24 feet diameter and 2½ miles long, taking the water from above the falls, and discharging into the river below the rapids, a number of turbines being driven in lateral tunnels with vertical shafts and operating manufacturing plants in works to be built on land acquired near the falls. Part of the scheme includes the disposal of the sewage of Niagara village; but the main idea is to erect a central electric plant, and it is calculated that there is power enough to drive 235 mills of 500-horse-power each, whereas 30 such mills would yield 5 per cent. on the calculated capital of \$3,000,000; besides, electric lighting power could be conveyed to a distance, including Buffalo, 20 miles away. The estimated obtainable horse-power is 120,000.

NICARAGUA CANAL. A treaty between the United States and the Republic of Nicaragua was signed Dec. 1, 1884, by the provisions of which the United States was to construct an inter-oceanic ship canal across the Nicaraguan territory. The treaty was sent to the United States Senate Dec. 10, 1884, by President Arthur, with an earnest recommendation that it should be approved. Owing to the pressure of legislative questions the treaty was not acted upon previous to the inauguration of President Cleveland, March 4, 1885. A few days later Mr. Cleveland withdrew the treaty from the Senate, declaring his non-approval of a "policy of acquisition of new and distant territory, or the incorporation of remote interests with our own." Later, on April 25, 1887, the Republic of Nicaragua granted to a company of United States citizens the right to build the canal across its territory, and a like grant was made to the same company by the adjoining Republic of Costa Rica. Subsequently the company was duly incorporated by act of Congress (approved Feb. 29, 1889) under the name of "The Maritime Canal Company of Nicaragua." This company, under the provisions of its grants

and its charter, is authorized to issue stock, make thorough surveys, to be approved by the naval engineers and the officers of the army and navy of the United States, and to construct the canal. Careful estimates place the probable cost at \$73,176,308, with possible contingent additional expenses, increasing total cost to about \$100,000,000. At this writing (June 1, 1891) the company, under the presidency of the Hon. Warner Miller, of New York, ex-Senator of the United States, is now engaged in completing its surveys, preliminary to the commencement of the work of construction proper. The plan is to make Greytown on the Atlantic coast, and Brito on the Pacific coast, the termini of the canal, the latter and the two harbors to be made deep enough to float the largest steamers. The extreme length of the canal route between the two oceans is 169.4 miles, and of this distance 142.6 miles is to be traversed by "slack-water" navigation in basins, lake and river, leaving only 26.8 miles of excavation to be made for the whole canal. The highest part of the waterway is only 110 feet above the two oceans, and the greatest altitude of the "divide" between the waters of Lake Nicaragua and the Pacific Ocean does not at any point exceed 42 feet. The ascent and descent is to be made by a system of locks near each end of the canal, and a singled dam across the San Juan River 1,250 feet long and averaging 61 feet high between two steep hills will furnish an ample navigable ship-channel 120 miles long between two series of locks for the commerce of the world. Lake Nicaragua is a remarkable body of water, filling a cavity between the mountains. Is is most healthfully located, and with the San Juan River presents a water-shed sufficient to furnish not only a safe and great internal harbor, but also an inexhaustible water supply for the lockage systems of the canal.

VALUE OF THIS ROUTE.—The great value of this

"Here, with such a vast water-supply at the summit, with the lake itself as a *summit level*, nature seems indeed to have offered assistance in connecting the oceans. No great engineering difficulties in utilizing the lake are claimed, even by opponents of this route. There are no startling propositions connected with the plan.

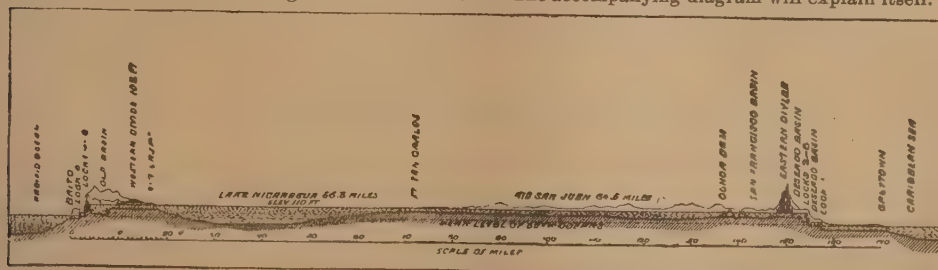
"The lake and San Juan River *must* be the great part of the canal, no matter how the openings to the sea are made."

ROUTE DISTANCES IN DETAIL.—As stated above, the route extends from Greytown on the Atlantic to Brito on the Pacific, a distance of 169.67 miles, divided as follows:

	Free Navigation.	Canal in Excavation.
Greytown to Deseado basin.....	.....	12.37
Deseado basin.....	4.00	
From Deseado basin to San Francisco basin.....	.....	3.07
San Francisco and Machado basins.....	11.0	1.73
River San Juan.....	64.00	
Lake Nicaragua.....	56.50	
From Lake Nicaragua to Tola basin.....	.....	8.22
Tola basin.....	5.28	
From Tola basin to Brito.....	.....	3.50
Total.....	140.78	28.89

The Deseado and Tola basins are new features, brought out by the last location, as well as an increase of 2,312 miles in the length of free navigation in the San Francisco and Machado basins, or in other words, the last location has reduced the length of canal in excavation by that same distance, while the summit level has been extended from 144.8 miles to 153.8 miles.

The accompanying diagram will explain itself.



new route has long been known. "Here in Nicaragua," said Commander H. C. Taylor, of the United States Navy,* "the backbone of the continents and isthmus, running parallel and close to the Pacific shore, sinks to its lowest point, while its eastern slope is washed by that great inland sea known as Lake Nicaragua. At this low point the divide is less than 60 feet above the level of the lake, and about 150 feet above the mean level of the Pacific. Though the western shore of the lake is but 15 miles from the beach of the Pacific, the lake drains through the River San Juan into the Caribbean Sea. The lake is deep and unobstructed, and the river, already navigable for light draught steamers throughout most of its length, requires but a little labor to deepen it.

The principal dimensions of the canal in excavation are as follows:

Material.	Width.		Depth.
	Bottom.	Top.	
Rock.....	80	80	30
Earth.....	120	180	30
Sand and loose material.....	120	360	30

The minimum radius of curvature is 2,500.

The leading engineering features, in greater detail, are: The construction of two harbors at the termini of the canal, Greytown on the Caribbean Sea, and Brito on the Pacific Ocean; the damming of the waters of the San Juan River, for the purpose of raising and maintaining the level of Lake Nicaragua and the river at about 110 feet above

*We quote largely in the remainder of this article from a paper read recently by Commander Taylor, before the Franklin Institute, and published in the *Journal* of the Institute.

mean tide; the formation of artificial basins at different levels by means of dams and embankments; and the use of locks, to pass from one level to another.

THE INTER OCEANIC HARBORS.—The harbors are, at present, not in good condition, but, by a comparatively small expenditure of money, can be made to offer protection to vessels of the largest class. The harbor of Greytown is now closed to vessels of more than six feet draught, but the facility for re-construction is such that in three months from the commencement of the work, at the outside, a temporary opening can be made, and material safely landed by vessels of fifteen feet draught. The further improvement of Greytown harbor is only a question of the continuation of the temporary opening. It is proposed to make this opening through the sand bar which now closes the once flourishing port of Greytown, by means of a temporary jetty of brush and pile, to furnish protection to a dredge working to cut through the bar. This jetty will also give the necessary protection for the maintenance of the cut so made. The extension and strengthening, by stone, of the jetty, and the continuation of the dredging, to form a permanent harbor, is simply a question of time. The construction of a wharf at Greytown, and of a railroad from it along the line of the canal, are the connecting links in the chain of supplies. The projected final depth of the harbor is thirty feet.

The harbor of Brito will be formed by two breakwaters, giving protection from the long swell of the Pacific, and the excavation of the harbor itself from the lowlands forming the banks at the mouth of the Rio Grande.

THE LIFTS OR THE CANAL ROUTE.—From Greytown, the sea level is carried to the site of the first lock, which is located at the eastern end of the valley of the Deseado. Here is a lift of thirty-one feet, into the first basin formed by damming the lower waters of the Deseado River. Through this basin we approach rapidly locks Nos. 2 and 3, which, with their respective lifts of thirty and forty-five feet, bring us to the summit level, and clear sailing through the basins of the Deseado and San Francisco, with the divide cut between, and thence into the San Juan River, across the lake and finally through the La Flor basin. Here, by means of a double lock, with a total fall of 85 feet, and again by the sixth, and last lock, we descend to the sea level. This last lock has a variable lift, depending on the state of the tide, which on the Pacific side has a mean rise and fall of about six feet at present. The mean lift of the tidal lock is twenty-five feet. The locks are 650×70×30 feet.

THE LARGE BASINS AND THEIR SUPPLY.—One of the principal features of the canal is the formation of large basins, by means of which the greater part of the canal is made a navigable body of water, instead of a narrow cut through the earth. As now projected, the first basin begins at the site of lock No. 1. This basin is formed by an embankment 1,100 feet long and 20 feet high, which maintains the level of the water at 31 feet above the sea level. A second embankment, 1,400 feet long and 86 feet high, near lock No. 2 (with a lift of 30 feet), maintains the level in a small basin at 61 feet. A third but smaller embankment, at lock No. 3 keeps the level at 106 feet. This is the summit level already referred to as extending from lock No. 3 to lock No. 4, a distance of 152 miles. The dam across the San Juan River at Ochoa, just east of the San Carlos, is 1,500 feet long by 65 feet high. Its purpose is to bank up the waters of the San Juan River, to a level of 106 feet, or 58 feet higher than at this

point now. By this means a lock and a large amount of dredging is saved, and the San Juan is thus made practically navigable to Castillo, while the amount of river dredging above this point is reduced to a minimum. It will be noticed that at the dam the level is given at 106 feet. At the lake it is 110 feet, and it is proposed to give the river a fall of four feet from the lake to Ochoa, a distance of about 64 miles. Again, on the Pacific side, an embankment 2,100 feet by 80 is made across the Rio Grande. This floods the valley of the Upper Rio Grande and its tributary, the Tola. Then by cutting through the low continental divide to the lake, the summit level of 110 feet is maintained to within three miles of the Pacific Ocean. The surplus flowage is provided for in all cases by numerous waste weirs of ample capacity. Lake Nicaragua has a watershed of 8,000 square miles.

The Rio San Juan, its only outlet, discharges at its lowest stage, near the close of the dry season, 11,390 cubic feet per second, or 984,096,000 cubic feet per day.

The amount of water required for thirty-two double lockages is 129,479,968 cubic feet, or a little more than one-eighth the total supply of the lake alone, to which must be added the flow of the several tributaries of the San Juan, between the lake and the sea, and the San Francisco and its tributaries.

NICARAUGUA, REPUBLIC OF. For general article on NICARAUGUA, see Britannica, Vol. XVII, pp. 477-80. The area, according to the latest authorized reports, is about 49,500 square miles, with a population of about 375,000. The great mass of the population consists of aboriginal Indians, mulattoes, negroes and mixed races, and the number of Europeans and their descendants is very small and on the decrease. There are few towns, and the chief occupation of the inhabitants is the rearing of cattle, carried on in a rude fashion. The old capital of the Republic is the city of Leon, ten miles from the Pacific, surrounded by five active volcanoes, and partly in ruins; its population is 25,000. At present the seat of government is the town of Managua, situated on the southern border of the great lake of the same name, with about 18,000 inhabitants.

According to the official statement of 1887, there were in that year 251 schools, with 11,914 pupils; and besides these two higher schools for boys and one for girls.

CONSTITUTION AND GOVERNMENT.—The constitution proclaimed in 1858 is still in force without material change. It vests the legislative power in a congress of two houses, the upper called the senate, comprising 18 members, and the lower, called the house of representatives, 21 members. Both branches of the legislature are elected by universal suffrage, the members of the house of representatives for the term of four, and those of the senate for six years. The executive power is with a president elected for four years.

The president exercises his functions through a council of responsible ministers, composed of the four departments, of foreign affairs and public instruction; finance; interior, justice, war, and marine; public works.

ARMY, FINANCE, AND COMMERCE.—The active army consists of 1,200 men, with a reserve of 10,000 men, and a militia or national guard of 5,000.

The latest official statement (that of Jan. 1, 1887) reports the aggregate public debt at \$1,592,000. At about that date a government loan was obtained in London for £285,000 in 6 per cent bonds secured by a mortgage on 93 miles of railway owned by the state.

The imports in 1888 amounted to \$2,146,000, and the exports to \$1,522,000. The culture of bananas has rapidly grown in recent years. The exports from San Juan del Norte in 1889 were valued at \$994,786, and the imports at \$231,229. The leading exports are coffee and india-rubber. Of the exports in 1888, \$665,000 went to Great Britain, \$253,000 to Germany, \$246,000 to France, \$334,000 to the United States. Of the imports in 1888, \$252,000 came from England, \$395,000 from the United States, \$351,000 from France, \$766,000 from Germany.

NICCOLINI, GIOVANNI BATTISTA, an Italian poet, born at the Bagni di S. Giuliano in 1782, died at Florence in 1861. In 1804, on the occasion of the plague at Leghorn, he wrote a beautiful poem entitled *La Pietà*; then followed his tragedies *Polissena*, *Medea*, *Edipo*, *Ino e Temisto*, *Matilda* and the translations of the *Seven from Thebes* and of the *Agamemnon*. For some time he was professor of history and mythology. His most successful works are *Nabucco*, an allegorical tragedy; *Antonio Foscari*, and his revolutionary drama, *Giovanni di Procida* (1830); *Filippo Strozzi* (1847), contained a representation of the fallen, yet not hopeless state of Italy.

NICHOL, JOHN PRINGLE, a Scotch astronomer, born at Brechin in 1804, died at Rothessay in 1859. He studied for the ministry, but after being licensed to preach became a popular lecturer on astronomy. He was professor of practical astronomy in the University of Glasgow. Among his published writings are *The Architecture of the Heavens*; *Contemplation of the Solar System*; *The Stellar Universe*; *The Planetary System*, and his *Cyclopedia of the Physical Sciences* (1867).

His son **JOHN NICHOL** was born at Montrose in 1838. He was professor of English literature in the University of Glasgow in 1861, and has contributed to the leading British reviews and to the *Encyclopedia Britannica*. His article on *American Literature* in this Encyclopedia has been published separately. He has also published *Hannibal*, a drama; *Byron*, in the English "Men of Letters" series and *Robert Burns* (1882).

NICHOLASVILLE, a village, the county-seat of Jessamine county, Ky., about fourteen miles southwest of Lexington. It contains a number of mills and is the seat of two academies.

NICHOLS, a family of printers and antiquarians, associated with the "Gentlemen's Magazine" from 1778 to 1856. To it belonged John Nichols; his son John Bowyer Nichols, and his son, John Gough Nichols.

NICHOLSON, ALFRED OSBORN POPE, United States Senator, born in Williamson county, Tenn., in 1808, died at Columbia, Tenn., in 1876. After studying medicine he turned to law and was admitted to the bar at Columbia, Tenn., in 1831. From 1832 to 1856 he edited successively "The Western Mercury" at Columbia, "The Nashville Union", and "The Washington Union." In 1857 he was elected to the United States Senate, but retired on the secession of Tennessee in June in 1861. During the war he was twice arrested at Columbia and imprisoned. In 1870 he was a member of the State constitutional convention, and was also elected chief justice of the supreme court of the State of Tennessee.

NICHOLSON, JOHN, a distinguished Indian soldier, born at Dublin in 1822, died Sept. 23, 1857. In 1838 he joined the East Indian Company's service, and in 1840 was ordered to Ghazni in Afghanistan. On the breaking out of the Sikh war he served in the campaign on the Sutlej, and was present at the battle of Ferozeshah. During the Sikh rebellion he greatly distinguished himself by his daring and promptitude. At the battles of Chillianwalla and

Gujrat he earned the approval of Lord Gough, to whom he was immediately attached. The Punjab having finally become a British province, captain Nicholson was appointed a deputy-commissioner under the Lahore board. In the mutiny in 1857 Nicholson did more than any other man to hold firm the British grasp of the Punjab. He suggested the formation of the famous movable column, and presided over its organization. In his dealings with the sepoys he exhibited a brilliant combination of boldness, subtlety, discretion, and astuteness. At Trimmoo Ghaut he nearly annihilated a force of rebels, and at Najafgarh he dispersed another body of mutineers. As brigadier-general he led the first column of attack at the siege of Delhi, and after the troops had forced their way into the city he still exposed himself in the most fearless manner, and fell, shot through the body.

NICKEL, see *Britannica*, Vol. XVII, pp. 487-8.

NICKER, a malignant kind of water-sprite in Teutonic mythology. He often presents himself on the shore in the shape of a horse, and has thus close affinities with the Scotch *kelpie*; while indeed the old Norse *níkr* is thought by some to mean the hippopotamus only. In English demonology we find both a male *nix* and a female *nixie*. The modern Dutch *nikker* is merely an ordinary evil spirit or devil, recalling our own familiar *Old Nick*. See *Britannica*, Vol. XVII, p. 483.

NICKERSON, a city of Kansas, about forty miles west of Newton, in the midst of a rich agricultural region.

NICOBAR ISLANDS. The Nicobars formerly belonged to Denmark, but were first occupied by the British in 1869, since when they have been affiliated to the chief commissionership of the Andamans. The primary objects with which the government station had been established, namely of suppressing piracy, having been attained, the establishment was removed December, 1888, since which the islands have been periodically visited by the station steamer from Port Blair, South Andaman. The annual yield of coconuts is about 15,000,000; one-third of this quantity is exported. Some of the streams are navigable by boats for some miles. The country is generally covered with thick tropical jungle, even to the summits of the mountains, which rise to an extreme height of 2,105 feet. Population, including aborigines, about 7,300. See *Britannica*, Vol. XVII, p. 489.

NICOL, ERSKINE, a British painter, born at Leith, Scotland, in 1825. He studied at the Trustees' Academy, and became a teacher of drawing. In 1862 he removed from Dublin to London, and was made an associate of the Royal Academy in 1866. His pictures exhibit great power of expression, both pathetic and comic. His best-known pictures are *Notice to Quit* (1862); *Waiting for the Train*; *Both Puzzled*; *A Disputed Boundary*; *Steady! Johnny*, *Steady! Paying the Rent*; *Storm at Sea*; *His Legal Adviser*; *Unwilling to School*, and *The Missing Boat* (1878).

NICOLAI, OTTO, a musical composer, born at Königsberg, in 1810, died in 1849. His early life was a struggle with poverty and difficulties. He studied in Berlin and in Rome, and in 1847 became Kapellmeister at Berlin. His best known work is the opera *The Merry Wives of Windsor*.

NICOLLE, ROBERT, a Scotch poet, born at Little Tulleybeltane, Jan. 7, 1814, died near Edinburgh, Dec. 7, 1837. He was four years a grocer's apprentice at Perth; he next opened a circulating library at Dundee, and here took to writing for the newspapers, and published a volume of *Songs and Lyrics*. In 1836 he became editor of the "Leeds Times," but

worked too zealously for his health, and gave himself his death-blow by his exertions in the victorious contest of Sir William Molesworth with Sir John Beckett in the summer of 1837. Nicoll was a genuine poet; it is from their intrinsic value that his countrymen remember such poems as *We are Brethren A'; Thoughts of Heaven*, and *The Dew is on the Summer's Greenest Grass*.

NICOLLET, JEAN NICOLAS, a French explorer, born at Cluses, Savoy, in 1786, died at Washington, D. C., in 1843. He studied astronomy under Laplace, and became secretary and librarian of the observatory at Paris in 1817. In 1832 he came to the United States. Here he explored the Southern States, the Mississippi River, and its western affluents. He collected at the same time many specimens of natural history. After this the United States War Department sent him on a second exploring tour to the far West, with Lieut. John C. Fremont as his assistant. He published *Cours de mathématiques à l'usage de la marine* (1830); and *Report Intended to Illustrate a Map of the Hydrographical Basin of the Upper Mississippi River* (Washington, 1843).

NIDDERDALE, the valley of the River Nidd, which rises at the foot of Wernside, England, and joins the Ouse a few miles above York. The upper portion flows through picturesque scenery, and past Ramsgill, the birthplace of Eugene Aram. Above Loffhouse it disappears underground for about two miles.

NIEDERWALD, the eastern termination of the Taunus range, that abuts upon the Rhine over against Bingen. On a commanding site near its summit was erected in 1883, the German memorial commemorative of the successful war of 1870-71. An extensive pedestal, ornamented with allegorical figures, is surmounted by a bronze figure of Germania, 34½ feet in height. Toothed railways carry visitors up to the monument from the villages of Rüdeshheim and Assmannshausen at the foot.

NIEDRINGHAUS, FREDERICK G., an American manufacturer and inventor, born in Germany in 1837. He came to the United States in 1855. He organized in St. Louis, with his brother William, the St. Louis Stamping Company, for the manufacture of tin-ware; invented what is known as granite iron-ware, and in 1881 established extensive rolling-mills, which, with the factory, employ about 1,200 hands. He was elected to Congress from Missouri in 1888.

NIEL, ADOLPHE, a French marshal, born at Muret Oct. 4, 1802, died Aug. 14, 1869. He entered the army as an engineer officer; took part in the storming of Constantine in Algeria, the siege of Rome, the bombardment of Bomarsund in Finland, the fall of Sebastopol, and in the battles of Magenta and Solferino. His share in these battles won him the marshal's baton. He was made minister of war in 1867, and was employed reorganizing the French army when he died.

NIERSTEIN, a village of Hesse-Darmstadt, on the Rhine, ten miles southeast of Mainz, famous for its Rhine wine. Population, 3,283.

NIFLHEIM ("the abode of clouds"), in Scandinavian mythology, the kingdom of cold and darkness, separated from Muspelheim, the kingdom of light and heat, by a huge chasm (Ginnungagap). Niflheim was also the abode of Hel, the goddess of death.

NIGELLA, a genus of plants of the natural order *Ranunculaceæ*. They are annuals, natives chiefly of the countries near the Mediterranean and the warmer temperate parts of Asia. Some of them, occasionally seen in gardens, are vulgarly known as *Devil-in-a-mist*. The seeds of *N. arvensis*, a species

common in corn-fields in the south of Europe, are supposed to be the Black Cummins of the ancients, and perhaps the Cummin of the Bible.

NIGER DISTRICT PROTECTORATE, a new protectorate of the British Empire in Africa, embracing an eastern boundary along the entire coast from the western line of Laos, near the river Binué, to the German boundary on the Rio del Rey, north of Cameroons, a distance of 380 miles, and vast inland regions not yet accurately defined. The protectorate is divided into two separate systems, namely the Niger Territories and the "Oil Rivers District."

NIGER TERRITORIES.—These are governed by the "Royal Niger Company," under a charter issued on July 10, 1886. Its nominal capital of £1,000,000 is fully subscribed, and it has powers to increase indefinitely. Its foundation dates from 1882, when it was formed under the name of The National African Company, Limited, with the object of obtaining these regions for Great Britain. This was effected by means of about 300 treaties with native States and tribes, including the territories of Sokoto and Gando.

SOKOTO.—At present the empire of Sokoto (attached by treaty to the Royal Niger Company) is the largest, the most populous, and extensive in the whole of the Sudan. Since the overthrow of the Haussa power early in the present century, the conquering Fulahs have gradually reduced all the former Haussa States between Lake Tsad and the Niger, and have also extended their sway southwards to Adamawa and westwards to the riverain tracts along the right bank of the Niger. The king of Gando, in the middle Niger valley, as well as all the other Fulah chiefs, recognize the suzerainty of the emperor of Sokoto, who is a direct descendant of Sheikh Dam-Fodíé Othman, founder of the Fulah dynasty in 1802. On the other hand, the reigning sovereign, whose special title is Seriki n'Musulmya, "Lord of the Musselmans," has virtually accepted the British protectorate, or, at least, acknowledged the political status of the Royal Niger Company, which exercises sovereign power throughout a large part of his dominions. These dominions comprise all the former Haussa States in west central Sudan, with an area of about 160,000 square miles, and a population scarcely exceeding 4,000,000; also the feudatory states of Gando (which some regard as independent of Sokoto), Nupé, Adamawa, and other outlying territory beyond the Binué-Niger confluence, with a total area of over 300,000 square miles, and a population vaguely estimated at 10,000,000. The empire, which is conterminous on the east with Bornu, on the west with the Yoruba and Mossi countries, and stretches from the Sahara southward to the unexplored regions beyond Adamawa, is especially rich in agricultural resources, exporting considerable quantities of rice (the chief cereal), and other grains, besides onions of excellent flavor, with the fruit of the butter tree, the parched seeds of the doria, dates, and honey. Cotton is largely grown, and manufactured into a durable material, colored with indigo and other native dyes. Much leather ware (shoes, sandals, pouches, harness) is also exported in exchange for salt from the Sahara and European goods.

The emperor exercises direct jurisdiction over only a comparatively small portion of his dominions, most of which are ruled by vassal kings and chiefs enjoying royal prerogatives, and attached to the central government only by payment of the annual tribute. There is a ministry, or council of state officials, comprising in their order of precedence the ghaladima, or prime minister, the commander

of the infantry, the *cadi*, or chief judge, the heir to the throne, the chief of the slaves, and the treasurer. A considerable revenue is levied by direct taxation and tribute from the vassal states. The army comprises in time of war about 90,000 infantry and 30,000 cavalry. Warno is the present capital on the river Gandi, population, 15,000. Besides these places there are a great many other large centers of population and busy market towns, such as Gando, capital of the kingdom of Gando; Yola, capital of Adamawa, population, 12,000; Kano, 35,000; Bida, 90,000; Gerki, 15,000; Kebbi, 22,000; Yakoba, 50,000; Tessawa, 12,000; Katsena, 7,500; Gurin, 12,000; Duku, 15,000. Fulah is the official language, but Hausa is the chief medium of intercourse throughout the empire, and in many places beyond its limits. Islam is the religion of the dominant class, but paganism still prevails largely throughout the empire.

The present capital of the Niger Territories is at Asaba, where the chief justice of the supreme court resides, and where are also the headquarters of the military force, the central prison, civil and military hospitals, and other public buildings. The other principal settlements are at Akassa (port of entry), Abo, Abutshi, Atani, Bakundi, Donga, Egga, Ibi, Idah, Leaba, Loko, Odeni, and Ribago, the latter being only about 200 miles from Lake Tsad. The trade in these inland territories is yet in its infancy, the exports having been 225,000*l.* in 1887, 230,000*l.* in 1888, and 260,000*l.* in 1889. The principal exports are gums, hides, india-rubber, ivory, kernels, palm oil, and vegetable butter, but a great variety of minor products are also exported. Considerable plantations of coffee and cocoa have been started, and a botanic garden created under the supervision of gardeners from Kew. The imports are very varied, the principal items being cotton, silks, woollens, earthenware, hardware, beads, tobacco, and salt. Heavy duties have been imposed by the company on spirits and gunpowder. Tobacco and salt are also taxed. All other imports are free. The revenue is principally raised by export duties. No trustworthy estimate can be formed of the population of the Territories.

The government is conducted by the Council in London, of which the president is Lord Aberdare.

OIL RIVERS DISTRICT.—This important region includes the whole of the coast line between Lagos and Camaroon, excepting that falling within the Niger Territories. Fully nineteen-twentieths of the extensive trade are in the hands of British merchants, who have been established there for a great number of years. The total value of this trade is not so great as in former days, owing to the heavy fall that has occurred of late years in the value of the principal export, palm oil. The average of the exports for the last three years has been 1,082,800*l.* per annum, and the import trade 786,500*l.*, much of both amounts being with Hamburg, Rotterdam, and other Continental ports. The chief products exported are palm oil, palm kernels, india-rubber, ivory, ebony, camwood, indigo, gums, barwood, hides, and a little cacao; and the imports consist of cloth, calico, hardware, spirits, tobacco, gunpowder, guns, rice, bread, salt, pickled meat, matches, soap, pottery, and fancy articles. The leading trade stations in the Oil Rivers district are Old Calabar (Duke Town and Creek Town), Qua Eboe, Opobo (town) and Azumeri, Ohumbela, Ogo-go, Essene, etc. (interior Opobo); New Calabar—including Degama, Dakana, Buguma, Okrika, etc.—Bonny, Brass Warri, Benni. No trustworthy estimate can be formed of the population of this district.

The majority of the merchants trading in the Oil Rivers amalgamated last year into the African As-

sociation, Limited, of Liverpool, with a nominal capital of 2,000,000*l.*, with power to increase as far as 5,000,000*l.* The subscribed capital is stated as 500,000*l.*

In 1890 a plan was formulated for the future government of the Oil Rivers district under the supervision of a British consul general. It is claimed that the protectorate is based upon treaties made in 1884.

NIGHT, among the ancient Greeks, a goddess who by means of sleep exercised power over men and gods. According to Hesiod, she was the daughter of Chaos, wife of Erebus, and mother of Aether and Hemera (Day), of the Fates, Sleep, Death, Dreams, Hunger, Fear, Nemesis, and Strife. By day she dwelt in Tartarus, enveloped in thick clouds.

NIGHT-HAWK, the usual name in the United States or the *Chordeiles popetue*, a goatsucker belonging to a different genus and species of the *Caprimulgidae* from the European goatsucker. It is found over nearly the whole of North America, has long, thin, pointed wings, a forked tail, a very small beak, and wide gaping mouth, furnished with bristles.

NIGHT-HERON. See *Britannica*, Vol. XI. p. 760-62.

NIGHTINGALE, FLORENCE, the daughter of William Nightingale of Embly Park, England, born at Florence in May 1820. She was highly educated and brilliantly accomplished. She early exhibited an intense devotion to the alleviation of suffering, which in 1844 led her to give attention to the condition of hospitals. She visited and inspected civil and military hospitals all over Europe; and in 1851 went into training as a nurse. In 1854 war was declared with Russia; Alma was fought and the hospitals on the Bosphorus were soon crowded with sick and wounded, their unhealthy condition becoming apparent in a rate of mortality to which the casualties of the fiercest battles were as nothing. In this crisis Miss Nightingale offered to go out and organize a nursing department at Scutari. Lord Herbert gladly accepted her services and she departed with thirty-four nurses. She arrived at Constantinople on the eve of Tukerman in time to receive the wounded into wards already filled with 2,300 patients. Her devotion to the sufferers can never be forgotten. She would stand twenty hours at a stretch, in order to see them provided with accommodation and all the requisites of their condition, and a few months after her arrival she had 10,000 sick men under her care. But she saw clearly in the bad sanitary arrangements of the hospitals the causes of their frightful mortality, and her incessant labor was devoted to the removal of these causes, as well as to the mitigation of their effects. In 1855, while in the Crimea, she was prostrated with fever; she refused to leave her post, and on her recovery remained at Scutari till Turkey was evacuated by the British, July 28, 1856. She, to whom many a soldier owed life and health, had expended her own health in the physical and mental strain to which she had subjected herself. At the close of the Crimean war a fund of £250,000 was subscribed for the purpose of enabling her to form an institution for the training of nurses; this is spent in training a superior order of nurses in connection with St. Thomas's (the Nightingale Home) and at King's College Hospital. From the queen she received an autograph letter of thanks, and a cross set with diamonds; also a bracelet set with brilliants from the sultan of Turkey. In 1858 she published valuable *Notes on Nursing*. The *Notes on Hospitals* (1859), from the clearness of arrangement and minuteness of detail, are most valuable to the arch-

itect, the engineer, and the medical officer. In 1871 she published *Notes on Lying-in-Institutions*; in 1873, *Life or Death in India* and (in "Fraser's Magazine") A "Note" of *Interrogation*, which attracted a good deal of attention on account of the way she handles religious beliefs and life.

NIGHTINGALE ISLANDS. See *Britannica*, Vol. XXIII, pp. 576-577.

NIHILISTS, NIHILISM, two words that have come into prominence in late years, in connection with Russian politics. Primarily the word Nihilism (Fr. *Nihilisme*, from the Lat. *nihil, nihilum*, nothing) signifies "the doctrine that nothing can be known; skepticism carried to the denial of all knowledge and reality." The Nihilists of Russia have been justly described as those "who disbelieve in any permanent improvement in the social condition or progress of man; particularly a member of a secret association which is devoted to the destruction of the present form of [Russian] government without any hope or definite theory of substituting another." The nihilist spirit appears to have permeated every stratum of Russian society. Its recruits are gathered from every social grade, alike from the nobles and the peasants. A series of political crimes of exceptional atrocity has marked the existence of a clique of assassins which for some years has baffled the utmost vigilance of the state police. Previous to the year 1878 the Nihilists contented themselves with the propagation of democratic ideas among the masses, urging the overthrow of the existing despotic government, but keeping pretty strictly within the ordinary line of socialistic agitation. In the year named, however, a new sect arose from the midst of the society referred to, calling themselves "Terrorists," and urging the most violent and sanguinary measures, and this group of men and women soon signalized themselves by a series of crimes of the gravest character. Assassination of those in power in Russia was their remedy for all social evils. Their first crime was the fatal shooting of Prince Krapotkine, governor of Kharkov, on Feb. 9, 1879, while he was returning home in a closed carriage. On the morning of April 2, 1879, as the Czar Alexander II. was walking near the Winter Palace, St. Petersburg, he was fired upon by Alexander Solovieff, who was soon after tried and executed. The pistol having failed, another weapon, dynamite, was called into requisition. No less than three attempts were made in 1879 to blow up the imperial train by undermining the roads over which it was expected to pass. A fourth attempt of a like character was made in the Winter Palace on Feb. 5, 1880. All of these were unsuccessful, though in three of them several persons were killed or injured. The diabolical schemes of the Nihilists were, however, at length successful, so far as the unfortunate czar was concerned. On Sunday, March 13, 1881, as the emperor was returning in a sleigh from a review, two nitro-glycerine bombs were thrown from among the crowd. The first missile, thrown by a man named Roussakoff, shattered the sleigh without injuring the czar, but the second, thrown by an accomplice after the czar had alighted, wounded him so terribly that he died within two hours. The two principal criminals, with three or four accessories, were hung April 15. The preceding facts require no comments; they speak for themselves; and in perusing them the dullest apprehension must be impressed with the wide gulf that separates patriots from political assassins.

NIJNI-TAGILSK, a town in the Russian government of Perm, amid the Ural mountains, 150 miles east of Perm, with great platinum, copper, and iron works. Population, 30,000.

NILE BARRAGE, completed in 1890, a practical reconstruction of the Rosetta and Damietta barrage works begun by Mongel Bey, a French engineer, in 1843, and completed in 1861. Briefly, the task was to render the floor above and below the obstruction or barrage impermeable to leakage, so that the gates, when closed, would be able to hold up the water during its deviation into the irrigation channels. The Rosetta barrage had a length of 465 metres and 61 arches, and the Damietta 71 arches and a length of 535 metres. It was estimated that during the five years in which the Nile Barrage was in progress of construction, the average annual value of the cotton crop alone was increased by \$4,000,000.

NILES, HEZEKIAH, journalist, born in Chester county, Pa., in 1777; died at Wilmington, Del., in 1839. He learned the printing trade, and became partner in an unsuccessful publishing firm at Wilmington in 1800. He afterwards removed to Baltimore. There he edited a daily paper for six years. In 1811 he founded the weekly journal, "Niles' Register," which he edited and printed till 1836. The historical information contained in it was considered so valuable that the first 32 volumes, extending from 1812 till 1827, were re-published. The "Register" was continued by his son, William Ogden Niles, until June, 1849, making altogether 76 volumes. Niles advocated the protection of American industry. He also published *Principles and Acts of the Revolution* (1822), and a series of humorous essays entitled *Quill-Driving*. The towns of Niles, Mich., and Niles, Ohio, were named in his honor.

NILES, a city of Michigan, at the head of navigation of St. Joseph river, about 90 miles east of Chicago. It contains numerous manufactories and is an important shipping point for flour, grain, lumber, and fruit. Population in 1890, 4,197.

NILES, a village of Ohio, on the Mahoning River, about ten miles southwest of Youngstown. It is an important railroad center and mining and manufacturing town.

NILOMETER, an arrangement for measuring the height of the Nile in Egypt. On the Island of Rhoda, opposite to Cairo, is a square well, connected with the river by a canal and containing a graduated marble pillar, divided into 24 cubits, each measuring 21.386 inches. A rise of 18 cubits is traditionally regarded as the height of the lowest inundation; 19 cubits is considered tolerable, 20 excellent, 21 adequate, and 22 complete, but 24 is ruinous. The ordinary maximum of the rise at Cairo is stated at from 24 to 26 feet.

NILSSON, CHRISTINE, an operatic singer, born at Wexio, in Sweden, in 1843. Singing at a fair in 1857, she so impressed a magistrate of Ljungby that he sent her for a musical education to Stockholm and Paris. She made her debut at Paris in *La Traviata* in 1864; and in London, where she appeared in 1867, she soon took rank as one of the foremost soprano singers. Marguerite is one of her best-known parts. She has repeatedly visited the United States. She was married in 1872 to M. Rouzand, who died in 1882; and subsequently she married at Paris the Count A. de Miranda. She retired from the stage in June, 1888.

NILSSON, SVEN, a Swedish naturalist and archaeologist, born near Landskrona in 1787, died at Lund in 1883. In 1812 he became instructor in natural history and afterwards overseer of the Zoological Museum. From 1831 till 1856 he was professor of zoology at Lund. His chief publications are *Ornithologia Suecica* (2 vols.), and *Skandinavisk Fauna* (4 vols.). His most important archaeological work is *Skandinaviska Nordens Urinne-*

vanère (4 vols. 1838-43). He also wrote works on the mollusks, fishes, and fossils of Sweden.

NIMACH, a town of India, in the territory of Gwalior, on the northwestern border of Malwa, 370 miles southwest of Delhi, 1613 feet above sea-level, with an agreeable and healthy climate. There has been a British cantonment here since 1817. Population of town, 5,161; of cantonment, 13,069.

NINA, LORENZO, an Italian cardinal, born at Recanati in 1812, died at Rome in 1885. In 1835 he was ordained priest and held various offices in the congregation of the council. Pope Pius IX. employed him on several delicate missions. In 1877 he was made cardinal deacon; and in August, 1878, Pope Leo XIII. appointed him under-secretary of state. At the same time he became prefect of the palace, and administrator of the property of the Holy See. He conducted some important negotiations with Russia, Germany, and Belgium.

NINE EYES, a popular name for the young lampreys found in rivers.

NIPIGON, a lake of Ontario, thirty miles northwest of Lake Superior, with which it is connected by the Nipigon River. It is about seventy miles long, but its deeply indented coast-line measures 580 miles. Its greatest depth is 540 feet. The lake is studded with hundreds of islands.

NIPISSING, a lake of Ontario, northeast of Lake Huron, into which it drains through the French River. It is about fifty miles long and twenty-eight miles wide.

NISARD, JEAN MARIE NAPOLEON DESIRÉ, a French author, born at Châtillon-Tur-Seine in 1806, died at Paris, in 1888. In 1830 he was employed in the ministry of public instruction, and held various positions until 1842, when he was elected to the chamber of deputies. In 1843 he became professor of Latin eloquence in the College de France, and in 1852 he was appointed general inspector of superior instruction. He also succeeded Villemain as professor of French eloquence at the Sorbonne. In 1857 he was made director of the higher normal school, which was then re-organized. He had been admitted to the French Academy in 1850, and was made senator in 1867, at the same time continuing to be a member of the imperial council of instruction. His principal works are *Histoire de la littérature française* (4 vols. 1861); *Études sur la Renaissance; Mélanges d'histoire et de littérature*; and *Les Quatre grands Historiens romains* (1874).

NITRIFICATION, the changing of nitrogenous organic matter or ammonia compounds into nitrates. Under certain conditions nitrification goes on in every fertile soil, the atmospheric nitrogen, nitrogenous organic matter, or ammonia compounds being converted, in the presence of lime or potash, into the corresponding *nitrates* of lime or potash; and from these *nitric* compounds plants derive the most of all of their nitrogen, although some experimentalists maintain that some plants obtain part at least of their nitrogen from ammonia.

NITROGLYCERINE, a high explosive. See *Britannica*, Vol. XVII, pp. 520-1, and *EXPLOSIVES*, in these Revisions and Additions.

In the manufacture of nitroglycerine the utmost care must be exercised, and any abnormal rise of temperature during the mixing of the materials must be strictly guarded against, as accidents would arise. For similar reasons the materials employed must be the best and purest attainable. Colorless when pure, but having as an article of commerce a pale brown color, nitroglycerine is a dense, oily liquid, having a specific gravity of 1.6. It is inodorous, but has a sweet, pungent, aromatic taste; a single drop, however, if placed on the back of the tongue, will produce headache and pain in the

back lasting for hours. By those accustomed to handling this substance, no inconvenience whatever is experienced. Nitroglycerine enters into medical prescriptions for certain diseases of the heart.

If ignited in the open air nitroglycerine burns rapidly and with a brisk flame without any explosion; and if poured out in a thin sheet it ignites with difficulty and burns incompletely; but it explodes at once if it is exposed to a moderately strong blow or concussion, to the concussion due to the explosion of gunpowder, to contact with red-hot iron, and especially to the action of detonating mixtures and fulminates. It likewise explodes on exposure to a high temperature, the exploding point for nitroglycerine compounds being about 420° F.; but 150° to 180° F. is sufficient to set up decomposition in the cartridge, and this will quickly raise the temperature to the exploding point. According to Dr. Rudolf Wagner, nitroglycerine, if chemically pure, may be cooled down to 4° without becoming solid; that of commerce, however, becomes solid if exposed for a considerable time to a temperature of about 40° to 45° F., crystallising in long needles, which are most dangerous to handle, since they explode, even if gently broken, with much violence. In such condition the nitroglycerine compounds should not be used for blasting, but can be readily thawed in a simple form of pan heated by hot water. At 320° nitroglycerine begins to decompose, giving off red vapors, and if the heat be suddenly applied, or slightly raised above this point, a violent explosion will occur. For equal bulks nitroglycerine is calculated to be thirteen times as strong as gunpowder, while for equal weights it is eight times as powerful.

We may add here, that nitroglycerine dissolved in two or three times its bulk of methylated spirits is quite explosive. When it is required for use, after it is thus dissolved, the addition of water will precipitate the nitroglycerine, the layer of water and spirit merely requiring decanting off. The nitroglycerine separated in this way possesses explosive properties fully as active as the original oil. In the state of solution it can be transported with safety to any distance.

The compounds of nitroglycerine have been employed in the largest blasts that have ever been made, notably those at Hell Gate near New York (see *HELL GATE IMPROVEMENTS* in these Revisions and Additions).

In the United States large quantities of nitroglycerine and its compounds are manufactured at the establishment of Mr. Mowbray, in North Adams, Mass. The blasting required for the Hoosac tunnel was done with explosives made at this factory.

NITROUS ETHER, or **NITRITE OF ETHYL**, a very volatile ether with an agreeable apple odor, and highly inflammable. In itself it is of little importance, but on account of its relation to the *sweet spirits of nitre* or *spirit of nitrous ether*, is one of the most important drugs. The sweet spirits of nitre contains in addition aldehyde and paraldehyde, and it is believed that to these we must ascribe much of its virtue. It is used, in conjunction with other medicines, as a diuretic, especially in the dropsy which follows scarlatina; and it is employed, in combination with acetate of ammonia and tartarized antimony, in febrile affections.

NIVERNAIS, formerly a province in the middle of France, nearly corresponding to the present department of Nièvre. Its towns enjoyed municipal privileges at a very early period. The principal landowners were the counts, afterwards dukes, of

Nevers, who held under their vassalage more than 1,800 fiefs.

NIX, or NIXY, a class, mostly malignant, of northern water-spirits.

NIX, or NIXY (Ger. *nichts*, nothing), a term as used by the employes of the railway mail service, denoting any piece of mail matter of domestic origin, chiefly of the first and second class, which is unavailable because addressed to a place in which there is no post-office, or to a state in which there is no such post-office as that indicated in the address.

NOAH, MORDECAI MANUEL, a journalist, born at Philadelphia of Jewish parentage in 1785, died at New York in 1851. Practicing law at Charleston, S. C., he turned his attention to politics, and was in 1813 made United States consul-general at Tunis. His consulship was made memorable by his rescue of several Americans that were held as slaves in the Barbary States. On his return to America he settled in New York City, where he founded and edited several newspapers, one of them being the "Sunday Times," the first Sunday newspaper published there (1834). He was elected sheriff of New York, and was appointed surveyor of the port and judge of the court of sessions. His most important published works are *Travels in England, France, Spain and the Barbary States* (1819); *Gleanings from a Gathered Harvest*; *Translation of the Book of Jasher*, and the successful dramas *Fortress of Sorrente*; *Paul and Alexander*; *She Would be a Soldier*; *Marion*, or *the Hero of Lake George*; *The Grecian Captive*, and *The Siege of Tripoli*.

NOBILE OFFICIUM, the term used in the law of Scotland to denote the high prerogative right of the court of sessions to exercise jurisdiction in certain cases—as, for example, to appoint a judicial factor to young children or to lunatics.

NOBLE, a gold coin first minted by Edward III., and so called from its being of noble metal; on one side was a ship, in allusion to Edward's victory at Sluys. The original value was half a mark. A later issue bore a rose on the same side as the ship, and were called *rose-nobles* and *ryals*. Silver having depreciated the value of the noble rose, a new coin of the old value was issued, called the *angel*.

NOBLESVILLE, a village, the county-seat of Hamilton county, Ind., situated on White River about twenty miles northeast of Indianapolis. It is an important center of local trade.

NOCTURN ("night-piece"), a dreamy musical piece, generally for the piano, especially associated with the names of Field, its inventor, and Chopin.

NODES: in astronomy, the two points in which the orbit of a planet intersects the plane of the ecliptic, the one through which the planet passes from the south to the north side of the ecliptic being called the *ascending node*, and the other the *descending node*.

NOE. See CHAM, in these Revisions and Additions.

NOEL, BAPTIST WRIOTHESLEY, an English clergyman, born at Leightmont, Scotland, in 1799, died at London in 1873. He graduated at Trinity College, Cambridge, in 1826, became one of the queen's chaplains and preached at St. John's, London. In 1849 he became a Baptist. Noel was a successful preacher. He was also very active in benevolent work among the poor in London. He published several volumes of sermons, some treatises on baptism and on the union of church and state.

NOGENT-LE-ROU, a town in the French department of Eure-et-Loir, prettily situated on the Huïse, ninety-three miles southwest of Paris. It is a long, well-built place, with the ruined château of the great Sully, his violated sepulcher, and a

statue of General Saint-Pol, who fell before Sebastopol. The Germans here won two fights, in 1870 and 1871. Population, 7,346.

NOGGING, brickwork built in the panels of a timber-framed house. Nogging-pieces are horizontal timbers, introduced to strengthen the brickwork.

NOILS, a technical term for short and broken hairs which are removed from wool in the process of combing it and preparing it for worsted manufactures. The noils are used for making inferior yarns, and are valuable for felting purposes, for which they are largely employed.

NOISSEVILLE, a village of France, five miles east of Metz, where Bazaine attacked the German besiegers of Metz with 120,000 men and 600 guns. He had some success on the first day, against the 41,000 men and 138 guns commanded by Manteuffel; but on the second day gave up the attempt to break through the German line, which had been re-enforced during the night by 30,000 men and 162 guns.

NOLDEKE, THEODORE, a German Orientalist born at Harburg in 1836, died in 1875. He studied at Göttingen, Vienna, Leyden, and Berlin. In 1864 he was made professor extraordinary at Kiel, and in 1868 professor ordinary. In 1872 he accepted a professorship at the newly established University of Strasburg. His published writings are *Geschichte des Korans* (1860); *Das Leben Mohammed's*; *Ueber die Anekdöten*; *Die Alttestamentliche Literatur*; *Kritik des Alten Testaments*, and *Die Inschrift des Königs Mesa von Moab* (1870). He also contributed to the *Encyclopedia Britannica*.

NOM DE PLUM, somewhat doubtful French for *nom de guerre* or Pseudonym.

NOMENCLATURE, GEOGRAPHICAL. Geographical names are spelled differently by different writers, and it is often difficult to know whether two unlike words belong to the same place or to different places. Otahiti and Tahiti are not easily recognizable as variants of the same name. Hawaii and Ohwyhee would naturally be taken as names of different places. It is clearly necessary that some uniform method of spelling the names of foreign places should be adopted. Feeling this need, the Royal Geographical Society of England adopted in 1886 the following rules, which were the same that were previously in use in the orthography of the admiralty charts. These rules apply only to the geographical names of the countries which do not write in Roman characters. In Spanish, Portuguese and Italian names, and in the names of all other countries that use Roman characters, the native spelling will be preserved. Nor will in any case a change be made in the spelling of names which long usage has rendered familiar to English readers. The true native sound of the word, as it is locally pronounced by educated people, is to be taken as the basis of the spelling, without regard to the finer inflections of the accent, a reasonable approximation to the sound being all that is deemed necessary. Vowels are to receive their Italian sound, and consonants have their English pronunciation. No accent is to be used but the acute, and this only where it is demanded by a particular stress upon a syllable. Every letter is to be sounded. When two vowels come together, each should be sounded, though their pronunciation in the combinations *ai*, *au*, *ei*, *eu*, etc., is often so rapid that they appear as one sound only. Hindu names will be accepted as they are spelled in Hunter's *Gazetteer*. The sounds of the several letters of the alphabet are as follows:

A as in *father*.

E as in *benefit* or *eh*.

I as in *belt* or English *e*. Thus, *Fiji*, not *Feejee*, is the correct spelling.

O as in *mole*.

U as in *flute*.

All vowels are shortened in sound by doubling the following consonant. The vowel is to be doubled only when there is a distinct repetition of the sound, as in *Nuulua*.

Ai corresponds to English *i*, as in *ice*.

Au corresponds to English *ow*, as in *how*.

Äo is slightly different from *au*, as in *Macao*.

Ei has the sound of the two Italian vowels, but is frequently slurred and resembles *ey* in *they*. Example, *Reirut*.

The consonant sounds are as follows:

B, D, L, M, N, P, R, S, T, V, W, and Z as in English.

C is to be always soft, but usually should be replaced by *S*, which it so closely resembles.

Ch always soft, as in *church*.

F as English *f*. Ph should not be used for *f*.

Write *Haifong*, not *Haiphong*.

G is always hard. Soft *g* is given by *j*.

H is to be always pronounced when given.

J as English *j*. Dj should never be used for *j*.

K as English *k*. This letter should always be used for hard *c*. Example: *Korea*, not *Corea*.

Kh is the Oriental guttural, as in *Khan*.

Gh is another guttural, as in Turkish *dagh*, or *ghazi*.

Ng has two sounds—one as in English *finger*, the other as in English *singer*.

Q should never be used.

Qu is given as *Kw*. Example: *Kwangtung*.

Y is always a consonant, as in *yard*. It should never be used as a terminal, but be replaced by *i* or *e*.

How much of these useful rules will be adopted by geographers is a matter to be settled by time. They may come into general use or may serve as a basis for more fully considered rules, to be chosen by some future congress of societies. At all events they mark an important step toward a highly desirable reform, and may arouse those who have suffered from the annoyance of indiscriminate spelling to some decided measures of improvement in this direction.

NON EST INVENTUS, a technical term used in that part of the law where, after judgment, the sheriff endeavors to arrest a party. If after a reasonable search he cannot find the debtor, he makes a return to the court that he has not been able to find the debtor, which is shortly called a return of *non est inventus*, and his duty is then discharged until a fresh writ is issued to him.

NON POSSUMUS (Lat. "we cannot"), a papal formula taken from Acts, iv. 20 (Vulgate), and said to have been used by Pope Clement VII. on reply to Henry VIII.'s demand for the dissolution of his marriage with Catherine of Aragon; used in general expression for the refusal of the Roman curia to yield to the demands of the temporal power.

NOOTKA DOG, a large kind of dog, common in a domesticated state among the natives of the vicinity of Nootka Sound. It has erect, pointed ears, and is chiefly remarkable for the extreme abundance of its long woolly hair, which, when shorn off, holds together as a fleece; and is spun and woven into garments.

NORDENSKJÖLD, BARON NILS ADOLF ERIK, an Arctic navigator, born at Helsingfors in Finland, in 1832. He acquired a taste for mineralogy, geology, chemistry and similar sciences from his father, the head of the mining department of Finland, and studied them further at the university of his native town and at Berlin. In 1857 he naturalized himself in Sweden, and in the following year was appointed head of the mineralogical department of the Royal

Museum at Stockholm. During the next twenty years he frequently visited Spitzbergen; in 1864 he completed the measurement of an arc of the meridian there, and mapped the south of the island. After two preliminary trips to the mouth of the Yenisei, by which he proved the navigability of the Kara Sea, he successfully accomplished (June 1878—September 1879), in the celebrated *Vega*, the navigation of the Northeast Passage, from the Atlantic to the Pacific along the north coast of Asia. On his return he was made a baron of Sweden, and during the next five years published the results of the journey in *Voyage of the Vega round Asia and Europe; Scientific Results of the Vega Expedition and Studies and Investigations*. He has also made two expeditions to Greenland; members of his party on the second occasion reached a point 140 miles distant from the east coast, but without finding the ice-free interior Baron Nordenskjöld believed to exist. In 1880 he published a book on the icy interior of Greenland. In 1891 he proposed to lead an expedition to the Antarctic polar regions, the expense being borne in part by the Australian colonies.

NORDHOFF, CHARLES, a journalist, born at Erwith, Westphalia, Prussia, in 1830. When five years old his parents brought him to this country, and schooled him at Cincinnati. In 1844 Nordhoff entered the United States navy. He served three years, making a voyage around the world. He remained at sea in the merchant, whaling, and mackerel fishery service until 1853, when he became employed in newspaper offices, first at Philadelphia, and afterwards in Indianapolis, Ind. From 1861 till 1871 he was on the editorial staff of the "New York Evening Post." Then he traveled in California and the Hawaiian Islands from 1871-73. After that he removed to Washington, D. C., where he has since been a special correspondent for the "New York Herald." His published works include *Man-of-War Life; Whaling and Fishing; Cape Cod and All Along Shore; Politics for Young Americans; The Communist Societies of the United States; The Cotton States in 1875, and God and the Future Life* (1881).

NORFOLK, a city and port of entry of Virginia, on the right bank of the Elizabeth River, eight miles from Hampton Roads, and thirty-three miles from the ocean. Population in 1890, 34,871. See *Britannica*, Vol. XVII, p. 537.

NORHAM CASTLE, the border fortress of the Bishops of Durham, on the right bank of the Tweed, eight miles southwest of Berwick. Founded in 1121, and deemed impregnable in 1522, it has memoirs of Kings John, Edward I., and James IV., but is known best through *Marmion*. The picturesque ruins comprise a great square keep, 70 feet high.

NORMAL, a village of Illinois, about two miles north of Bloomington. It contains manufactories of brick, paper and woollens, and is the seat of the Illinois State Normal University.

NORMAL SCHOOLS, institutions in which the pupils are trained to become teachers. The pupils are young men or women, generally between seventeen and twenty years of age, who have passed through a grammar school, or even a superior school, and who have passed an examination in reading, writing, grammar, arithmetic, and in the geography of their own country. Most normal schools in this country were modeled after those of the State of Massachusetts, and most of the European normal schools took those of the kingdom of Prussia as their patterns.

According to the report of the United States Commissioner of Education for the year 1886-7 the

numbers of normal schools in foreign countries are as follows: Austria-Hungary, 139; Belgium, 51; Germany, 164; England and Wales, 43; Scotland, 7; Ireland, 4; Italy, 184; Japan, 80; Netherlands, 7; Russia in Europe, including Finland, 61; British India, 108; Bombay Presidency, 11; New Brunswick, 1; Nova Scotia, 1; Ontario, 2; Prince Edwards Island, 1; Quebec, 1; Argentine Republic, 20; Chili, 3; Venezuela, 4; New South Wales, 2; South Australia, 1; Victoria, 1; New Zealand, 4; Switzerland has one normal school for each canton; France, had 90 in 1883, with 1,193 students.

The public normal schools in the United States numbered 119 in the year 1886. They had 1,115 teachers and 31,800 students. Ninety-six of these schools are supported by the States and twenty-one by cities. There were also thirty-six private normal schools, with 279 instructors and 8,524 students. These schools are distributed among the States as follows:

States.	Public.	Private.	States.	Public.	Private.
Alabama.....	6	2	Nebraska.....	2	1
Arkansas.....	1	1	New Hampshire.....	2	0
California.....	3	2	New Jersey.....	3	1
Colorado.....	1	1	New York.....	11	0
Connecticut.....	1	0	North Carolina.....	5	2
Florida.....	1	0	South Carolina.....	1	3
Georgia.....	0	0	Ohio.....	5	1
Illinois.....	3	2	Oregon.....	1	0
Indiana.....	3	5	Pennsylvania.....	11	2
Iowa.....	3	2	Rhode Island.....	1	0
Kansas.....	1	1	Tennessee.....	1	4
Kentucky.....	0	4	Texas.....	1	2
Louisiana.....	2	2	Vermont.....	3	0
Maine.....	5	4	Virginia.....	4	0
Maryland.....	2	0	West Virginia.....	6	0
Massachusetts.....	10	0	Wisconsin.....	5	2
Michigan.....	1	0	Dakota.....	2	0
Minnesota.....	3	0	District of Columbia.....	2	0
Mississippi.....	1	3	Utah.....	0	0
Missouri.....	5	0	Washington.....	1	0

In the American normal schools the studies first attended to are those which the law of the respective State requires to be taught in the district schools, namely: orthography, reading, writing, English grammar, United States geography and arithmetic. When these are mastered, studies of a higher order are progressively taken up. Those pupils who take the full course of three years, are in addition instructed in composition, rhetoric, logic, penmanship and drawing, higher arithmetic, algebra, geometry, book-keeping, surveying, ancient and modern geography, chronology, general history, human physiology and hygiene, mental and natural philosophy, history of the United States, natural history, astronomy, music,—and above all the science and art of teaching with reference to all the above-named studies. A portion of the Scriptures is required to be read daily in every State normal school.

NORMANBY, a town of England, three and a half miles southeast of Middlesborough. Population, 7,714. It gave the title of marquis in 1694 to John Sheffield, Earl of Mulgrave and afterwards Duke of Buckinghamshire, as also in 1838 to Constantine Henry Phipps, previously Earl of Mulgrave and a distinguished statesman. See *Britannica*, Vol. XVII, p. 538.

NORNS, the *Parce* of Scandinavian mythology, three maidens, by name Urd, Verdandi and Skuld, that is, Past, Present and Future. They sit by the well of Urd, under the world-tree Ygdrasil in Asgard, and there determine the fate of gods and men. Besides these there are inferior norns, good

and bad, answering to the genii of classical mythology; to such are attributable the unequal destinies of men in the world. Women who possessed the power of prediction or magic also bore this name.

NORONHA, FERNANDO DE, a group of small islands belonging to Brazil, in the South Atlantic, about 200 miles northeast of Cape San Roque. The group is of volcanic character, phonolite and other rocks of late formation resting on a foundation of basalt. A curious calcareous sandstone is also common, consisting of sand and fragments of shells, rendered firm by the action of water. The climate is healthy, and the trade-winds keep the temperature moderate. The islands are fertile, and maize, sugar, sweet potatoes, casavas, melons and bananas are raised. The low hills and valleys of the main island are thickly wooded; a sort of fig (*Ficus Noronhae*), like the Banyan, drops aerial roots from its branches. The group was visited in 1775 by Captain Cook, and in 1832 by Darwin, who investigated its geology. The main island has been made a penal settlement, where about 1,500 convicts are kept, guarded by 200 soldiers. See *FERNANDO DE NORONHA*, *Britannica*, Vol. IX, p. 99.

NORRISTOWN, a handsome borough, the county-seat of Montgomery county, Pa., on the left bank of the Schuylkill, sixteen miles northwest of Philadelphia. Population in 1890, 19,791. See *Britannica*, Vol. XVII, p. 653.

NORTHFIELD, a village of Massachusetts, pleasantly situated on the east bank of the Connecticut River, just south of New Hampshire. It is the birthplace of Dwight L. Moody, the evangelist, and the headquarters of the Christian educational institution founded by him, including Northfield Seminary for young ladies, located at Northfield, and Mount Hermon School for young men, in the town of Gill, four miles distant. Population, 1,705.

NORTH ADAMS, a manufacturing village of Massachusetts, picturesquely situated on the Hoosac River, near the west end of the Hoosac Tunnel, 143 miles west of Boston. Population in 1890, 16,074. See *Britannica*, Vol. XVII, p. 255.

NORTHAMPTON, a city, the county-seat of Hampshire county, Mass., near the west bank of the Connecticut River, 103 miles west of Boston. Population in 1890, 14,990. See *Britannica*, Vol. XVII, p. 558.

NORTH BERWICK, a fashionable watering-place of England, at the entrance to the Firth of Forth, twenty-three miles northeast of Edinburgh. Behind it rises conical North Berwick Law (612 feet), and westward stretch splendid golf-links. Tantallon Castle, three miles east, fronting the Bass Rock, is a magnificent ruin, finely described in Scott's *Marmion*. A stronghold of the Douglasses, it resisted James V. in 1528, but in 1639 was "dung down" by the Covenanters. Robert III. made North Berwick a royal burg. Population, 1,711.

NORTH CAPE, the northernmost point in Europe, in 71° 10' north latitude. It is not, however, on the continent, but on the island of Magerö. The northernmost point on the continent is Cape Nordkyn (71° 6' N. Lat.), six miles farther south than the North Cape, and some forty-five miles to the east of it.

NORTH CAROLINA, STATE OF. For general article on NORTH CAROLINA, see *Britannica*, Vol. XVII, pp. 558-562. The census of 1890 reports the area and population as follows: Area, 52,250 square miles; population, 1,617,947, an increase during the decade of 218,197. Capital, Raleigh, with a population of 12,678. The following table gives the population of the cities and towns which in 1890 had each over 8,000 inhabitants; also their

population in 1880 and their increase during the decade:

Cities and towns.	1800.	1880.	In-crease.	Per cent.
Asheville.....	10,335	2,616	7,619	291.25
Charlotte.....	11,557	7,094	4,463	62.91
Raleigh.....	12,678	9,265	3,413	36.84
Wilmington.....	20,056	17,350	2,706	15.60
Winston.....	8,018	2,854	5,164	180.94

The census returns of several other cities and towns in the State were as follows: Fayetteville, 4,223; Goldsborough, 4,325; Greensborough, 3,317; Newburne, 7,817; Salisbury, 4,417; Washington, 3,574; Elizabeth City, 3,249.

AREA AND POPULATION BY COUNTIES.—The land area in square miles, and the population, severally, of the counties of the State were as follows in 1890:

Counties.	Area.	Population.	
		1890.	1880.
Alamance.....	446	18,271	14,618
Alexander.....	278	9,430	8,355
Allegheny.....	284	6,523	5,486
Anson.....	460	30,027	17,994
Ashe.....	426	16,838	14,437
Beaufort.....	748	21,072	17,474
Bertie.....	685	19,176	16,399
Bladen.....	890	16,763	16,158
Brunswick.....	890	10,900	9,389
Buncombe.....	628	35,386	21,909
Burke.....	620	14,939	12,809
Cabarrus.....	392	18,142	14,964
Caldwell.....	460	12,298	10,291
Camden.....	250	5,667	6,274
Carroll.....	510	19,835	9,784
Caswell.....	410	16,028	17,825
Catawba.....	388	18,689	14,946
Chatham.....	784	26,413	23,453
Cherokee.....	580	9,976	8,182
Chowan.....	230	9,167	7,900
Clay.....	169	4,197	3,316
Cleveland.....	420	20,394	15,571
Columbus.....	940	17,856	14,439
Craven.....	792	20,533	19,729
Cumberland.....	794	27,321	23,896
Currituck.....	217	6,747	6,476
Dare.....	240	3,768	3,243
Davidson.....	580	21,702	20,333
Davie.....	296	11,621	11,096
Duplin.....	828	18,690	18,773
Durham.....	292	18,041	
Edgecombe.....	530	24,113	26,181
Forsyth.....	372	28,494	18,070
Franklin.....	480	21,090	20,829
Gaston.....	340	17,764	14,234
Gates.....	360	10,252	8,897
Graham.....	250	8,313	2,335
Granville.....	600	24,494	31,286
Greene.....	310	10,030	10,037
Guilford.....	680	28,052	23,585
Halifax.....	680	28,908	30,300
Harnett.....	560	13,700	10,562
Haywood.....	590	13,346	10,271
Henderson.....	360	12,589	10,281
Hertford.....	324	13,851	11,843
Hyde.....	435	8,903	7,765
Iredell.....	610	25,462	22,675
Jackson.....	552	9,512	7,243
Johnston.....	680	27,229	23,461
Jones.....	430	7,403	7,491

Counties.	Area.	Population.	
		1890.	1880.
Lenoir.....	408	14,879	15,344
Linsell.....	312	12,586	11,061
McBowel.....	476	10,839	9,835
Macou.....	524	10,102	8,064
Madison.....	480	17,865	12,610
Martin.....	570	15,221	13,140
Mecklenburg.....	640	42,678	34,175
Mitchell.....	324	12,207	9,435
Montgomery.....	596	11,289	9,374
Moore.....	924	20,479	16,821
Nash.....	548	20,707	17,731
New Hanover.....	90	24,026	21,376
Northampton.....	568	12,514	12,468
Onslow.....	640	10,308	9,829
Orange.....	380	14,948	23,698
Pamlico.....	460	7,146	6,328
Pasquotank.....	200	10,748	10,369
Pender.....	800	12,514	12,468
Perquimans.....	240	9,283	9,466
Person.....	420	15,151	13,719
Pitt.....	658	25,519	21,794
Polk.....	276	5,902	5,063
Randolph.....	756	25,195	20,535
Richmond.....	89	22,948	18,245
Robeson.....	1,040	31,483	23,880
Rockingham.....	608	25,363	21,744
Rowan.....	458	24,128	19,965
Rutherford.....	498	18,770	15,198
Sampson.....	996	26,035	22,394
Stanly.....	89	12,136	10,506
Stokes.....	510	17,199	15,353
Surry.....	490	19,281	15,302
Swain.....	425	6,687	3,734
Transylvania.....	335	6,881	5,840
Tyrrell.....	380	4,225	4,545
Union.....	640	21,259	18,056
Vance.....	342	17,681	
Wake.....	940	49,207	47,932
Ware.....	450	19,360	22,619
Washington.....	360	10,200	8,928
Watauga.....	392	10,611	8,160
Wayne.....	615	26,100	24,951
Wilkes.....	680	22,675	19,181
Wilson.....	365	18,644	16,064
Yadkin.....	820	13,790	12,420
Yancey.....	298	9,490	7,694

GOVERNORS OF NORTH CAROLINA.—The following is a complete list of the governors of the State, with the periods and dates of service:

UNDER THE LORDS PROPRIETORS.

George Drummond.....	1663-67	Alex. Livingstone.....	1696-96
Samuel Stevens.....	1667-74	Thomas Harvey.....	1696-1706
— Cartwright.....	1674-77	Henderson Walker.....	1705-9
— Miller.....	1677-78	William Grover.....	1709-10
John Culpepper.....	1678-80	Edward Hays.....	1710-22
John Harvey.....	1680-81	Thomas Pollock.....	1722-34
John Jenkins.....	1681-83	William Reed.....	1722-24
Seth Sothel.....	1683-89	George Burrington.....	1723-26
Philip Ludwell.....	1689-93	Sir Richard Everhard.....	1726-30

UNDER THE CROWN.

George Burrington.....	1730-34	Matthew Rowan.....	1754
Gabriel Johnston.....	1734-53	Arthur Dobbs.....	1754-65
Nathaniel Rice.....	1653-64	William Tryon.....	1765-71

Josiah Martin, 1771-75.

STATE GOVERNMENT.

Richard Caswell.....	1777-79	John Owen.....	1828-30
Abner Nash.....	1779-81	Montfort Stokes.....	1830-33
Alexander Martin.....	1781-84	David L. Swain.....	1833-35
Richard Caswell.....	1784-87	Richard D. Spaight.....	1835-37
Samuel Johnston.....	1787-89	Edward B. Dudley.....	1837-41
Alexander Martin.....	1789-92	John M. Morehead.....	1841-45
Richard D. Spaight.....	1792-95	William A. Graham.....	1845-49
Samuel Ashe.....	1795-98	Charles Manly.....	1849-51
William R. Davie.....	1798-99	David S. Reid.....	1851-56

STATE GOVERNMENT.

Benjamin Williams.....1799-1802	Thomas Bragg.....1855-59
James Turner.....1802-5	John W. Ellis.....1859-61
Nathaniel Alexander.....1805-7	H. T. Clark.....1861-62
Benjamin Williams.....1807-8	Zebulon B. Vance.....1862-65
David Stone.....1808-10	William W. Holden.....1865-68
Benjamin Smith.....1810-11	Jonathan Worth.....1868-81
William Hawkins.....1814-14	William W. Holden.....1868-81
William Miller.....1814-17	Tod R. Caldwell.....1871-74
John Branch.....1817-20	Curtis H. Brogden.....1874-77
Jesse Franklin.....1820-21	Zebulon B. Vance.....1877-79
Gabriel Holman.....1821-24	Thomas J. Jarvis.....1879-85
Hutchings G. Burton.....1824-27	Alfred M. Scales.....1885-89
James IredeU.....1827-28	Daniel G. Fowle.....1889-93

The governor's official term closes Jan. 1, 1893. The governor's salary is \$3,000.

CONDENSED HISTORIC OUTLINE.—North Carolina was first permanently colonized from Virginia in 1653. Down to 1693 in continued to form one province along with South Carolina, the two being frequently classed as the Carolinas. In a local declaration of independence of May, 1775, 14 months before the 4th of July, 1776, North Carolina first formally demanded a separation from Great Britain. The important battle of Guilford Court House was fought March 15, 1781.

Progress of population in North Carolina by decades: In 1790, 393,751; 1800, 478,103; 1810, 555,500; 1820, 638,829; 1830, 735,987; 1840, 735,419; 1850, 869,039; 1860, 992,622; 1870, 1,071,361; 1880, 1,399,760; 1890, 1,617,947.

NORTH CAROLINA, UNIVERSITY OF. See COLLEGES AND UNIVERSITIES IN UNITED STATES, in these Revisions and Additions.

NORTHCOTE, SIR STAFFORD. See IDDESLEIGH in these Revisions and Additions.

NORTH DAKOTA, STATE OF. For general article, see Britannica, Vol. VI, pp. 773-774. The census of 1890 reports the area and population as follows: Area, 70,795 square miles; population 182,719, an increase during the decade of 145,810. Capital, Bismarck, with a population of 2,260. The census returns of several other towns in the State were as follows: Fargo, 5,613; Grand Forks, 4,963.

AREAS AND POPULATION BY COUNTIES.—The land areas in square miles, and the population, severally, of the counties of the State were as follows in 1890:

Counties.	Area.	Pop. 1890.	Pop. 1880.
Alfred (a).....	450		
Barnes.....	1,512	7,045	1,585
Benson.....	1,368	2,460	
Billings.....	3,360	170	1,323
Bottineau.....	1,130	2,893	
Bowman.....	1,224	6	
Buford.....	1,620	803	
Burlingh.....	1,692	4,252	3,246
Cass.....	1,764	19,613	8,998
Cavalier.....	1,512	6,471	
Church (a).....	1,020		
Dickey.....	1,152	5,573	
Dunn.....	1,152	159	
Eddy.....	648	1,377	
Emmons.....	1,584	1,971	38
Flannery.....	1,800	72	
Foster.....	648	1,210	
Garfield.....	918	33	37
Grand Forks.....	1,404	18,357	6,248
Griggs.....	720	2,817	
Hettinger.....	2,160	81	
Howard.....			12
Kidder.....	1,440	1,211	89
La Moure.....	1,152	3,187	20
Logan.....	1,008	597	
McHenry.....	1,476	1,558	
McIntosh.....	1,008	3,248	

Counties.	Areas.	Pop. 1890.	Pop. 1880.
McKenzie.....	1,080	3	
McLean.....	702	860	
Mercer.....	711	428	
Morton.....	3,168	4,728	200
Mountain.....	2,891	122	13
Nelson.....	1,008	4,293	
Oliver.....	720	464	
Pembina.....	1,120	14,334	4,862
Pierce.....	864	905	
Ramsey.....	936	4,418	281
Ransom.....	864	5,333	537
Renville.....	1,232	99	
Richland.....	1,440	10,751	3,597
Rolette.....	936	2,427	
Sargent.....	864	5,076	
Sheridan (a).....	900		
Stark.....	1,310	2,301	
Steele.....	720	3,777	
Stevens.....	1,116	16	247
Stutsman.....	2,204	5,265	1,007
Towner.....	1,011	1,450	
Trall.....	864	10,270	4,123
Wallace.....	1,323	24	
Wallete.....			432
Walsh.....	1,584	16,587	
Ward.....	1,512	1,681	
Wells.....	1,296	1,212	
Williams.....	1,260	109	14

GOVERNORS OF DAKOTA TERRITORY AND OF NORTH DAKOTA.—The following is a complete list of the governors with the periods and dates of service:

GOVERNORS OF DAKOTA TERRITORY.

William Jayne.....1861-63	Wm. A. Howard.....1878-80
Newton Edmonds.....1863-66	Nehemiah G. Ordway.....1880-84
Andrew J. Faulk.....1866-69	Gilbert A. Pierce.....1884-86
John A. Burlant.....1869-73	Louis K. Church.....1886-89
John L. Pennington.....1873-78	

GOVERNORS OF NORTH DAKOTA.

John Miller.....1889-91	A. H. Burke.....1891-98
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Governor Burke's official term closes Jan. 3, 1893. The governor's salary is \$3,000.

CONDENSED HISTORIC OUTLINE.—The territory of Dakota was embraced in the Louisiana tract ceded to the United States in 1803. Dakota Territory was organized in 1861. An Indian war with Little Crow's band took place in 1862. Another Indian war prevailed in 1863. The capital of the territory was removed from Yankton to Bismarck in 1883. The bill dividing the Territory into North and South Dakota passed the United States Senate April 19, 1888. John Miller was elected governor Oct. 1, 1889. The President proclaimed North Dakota admitted into the Union as a State, Nov. 2, 1889. Gilbert A. Pierce and Lyman R. Casey were elected United States Senators Dec. 1889. Henry C. Hansbrough was elected United States Senator to succeed Gilbert A. Pierce, Jan. 1891.

NORTHFIELD, a village of Minnesota on Cannon River, forty miles south of St. Paul. It is the seat of Carleton and St. Olaf colleges and has various manufacturing industries. Population in 1890, 2,657.

NORTHFIELD, a village of Vermont, about ten miles southwest of Montpelier. It is extensively engaged in manufacturing and slate-quarrying, and is the seat of Norwich University.

NORTH MAGNETIC POLE. See Britannica, Vol. XVI, p. 163; also Vol. XV, p. 221. See also

ARCTIC EXPLORATIONS (Proposed Expeditions), in these Revisions and Additions.

NORTH PLATTE, a village of Nebraska, at the confluence of the Forks of the Platte River. It contains a United States land-office, railroad shops, and is largely engaged in stock-raising.

NORTHPORT, a village of New York, on Long Island, forty miles east of Brooklyn. It is engaged in fishing and ship-building.

NORTH SEA AND BALTIC CANAL, a canal begun in 1887, and described as a portion of a scheme of German coast defense. It is intended to unite the Gulf of Kiel with the mouth of the Elbe, running from Holtenau by way of Rendsburg to a point midway between Brunsbüttel and St. Margarethen, a few miles below Hamburg. Its measurements are thus given: 61 miles long, 196 feet broad at water level, 85 feet at bottom, and 28 feet deep, there being a lock at each end. The largest German warship will be able to enter at all states of the tide, and pass through in eight hours. It is intended to supplement this strategical waterway by means of another canal traversing Hanover from Neuhaus, opposite Brunsbüttel to Bremerhaven, at the mouth of the Weser; and it will then be possible to pass between Kiel and Wilhelmshaven on what are practically inland waters.

NORTHUMBERLAND, a borough of Pennsylvania, beautifully situated in the midst of wild mountain scenery, at the confluence of the two branches of the Susquehanna, about twelve miles southwest of Danville.

NORTH VERNON, a village of Indiana, and an important manufacturing center, about twenty miles southeast of Columbus.

NORTH WALSHAM, a small market-town of England, in the county of Norfolk, on an acclivity on the right bank of the Ant, fourteen miles northeast of Norwich. Its market-cross, repaired after the great fire in 1600, by which the town was almost entirely burned down, dates from the reign of Edward III. Population, about 3,000.

NORTHWESTERN UNIVERSITY, at Evanston, Ill. See COLLEGES AND UNIVERSITIES IN THE UNITED STATES, in these Revisions and Additions.

NORTH YAKIMA, a city, the county-seat of Yakima county, Wash., situated at the confluence of the Yakima and Natchess rivers. It contains a United States land-office, a young ladies' academy, and numerous manufactories.

NORTON, ANDREWS, an American theologian, born at Hingham, Mass., Dec. 31, 1786, died at Newport, R. I., Sept. 18, 1858. He graduated at Harvard in 1804, was appointed mathematical tutor there in 1811, and in 1813 librarian of the university and lecturer on biblical criticism and interpretation. In 1819-30 he was Dexter professor of sacred literature. He was among the most distinguished exponents of Unitarianism, equally determined in his protest against Calvinism and in his opposition to the school of Theodore Parker and the naturalistic theology. His chief writings are *Reasons for not believing the Doctrines of Trinitarians*, and two works on *The Genuineness of the Gospels*. He made also a translation of the Gospels, which after his death was edited by Dr. Ezra Abbot and his son, Charles Eliot Norton, who was born at Cambridge, Mass., Nov. 16, 1827, and graduated at Harvard in 1846. He traveled in India and Europe in 1849-51, and again in Europe in 1855-57 and 1868-73, and in 1864-68 was joint editor with Lowell of the "North American Review." He has published a number of works relating to Italy, and edited Carlyle's letters.

NORTON, JOHN, a Puritan clergyman, born at Hartford, England, in 1606, died at Boston, Mass.,

in 1663. He was a curate in his native town. Having embraced the tenets of the Puritans, he removed in 1635 to Plymouth, Mass. Next year he became minister of the church at Ipswich, and in 1652 associate minister of the First Church at Boston. After the restoration of Charles II., Norton accompanied Gov. Bradstreet as agent of the colony to London to assure the king of the loyalty of Massachusetts. The king assured them that he would confirm the charter of the colony, but he required that justice should be administered in his name, and attached other conditions which the colonists considered arbitrary. Upon the return of the agents, the report was circulated that they had sold the liberties of the country. This hastened Norton's death. His most noted publication was *The Heart of New England Rent by the Blasphemies of the Present Generation* (1660), a treatise directed against the Quakers, whom he wanted to be driven out of New England.

NORTON, RICHARD H., born at Troy, Mo., Nov. 6, 1849. He was educated at the St. Louis University; graduated in the law department of Washington University; practiced law in his native town; was elected to Congress from Missouri in 1888, and re-elected in 1890.

NORTON, WILLIAM EDWARD, painter, born at Boston, Mass., in 1843. At the age of eighteen he went to sea, and, after making several voyages, began painting marine views in 1865. In 1877 he removed to London, where he opened a studio. Among his best known works are: *Whaleships Trying Out; Fog on the Grand Banks; Twilight on the Banks of Newfoundland*, and *Nantasket Beach in November*.

NORWALK, a borough and township of Connecticut, on Long Island Sound, at the mouth of the Norwalk River, 41 miles northeast of New York. Population in 1890, 17,739. See *Britannica*, Vol. XVII, p. 574.

NORWALK, the county-seat of Huron county, Ohio, 55 miles southwest of Cleveland. Population 5,704. See *Britannica*, Vol. XVII, p. 574.

NORWAY. For general article on the KINGDOM OF NORWAY, see *Britannica*, Vol. XVII, pp. 575-592. Norway has an area of 123,205 square miles. The official census of 1875 (the latest published) placed the population at 1,818,853. The following table gives the population by provinces:

Counties.	Area.	Population, 1875.
Kristiania (town).....	6	76,054
Akershus.....	2,002	116,365
Smaalenem.....	1,591	107,804
Hedemarken.....	10,056	120,618
Kristians.....	9,670	115,814
Buskerud.....	5,617	102,186
Jarlsberg og Larvik.....	872	87,506
Bratsberg.....	5,707	88,171
Nedene.....	3,871	78,415
Lister og Mandal.....	2,808	75,121
Stavanger.....	3,468	110,965
Søndre Bergenhus.....	6,868	119,308
Bergen (town).....	8	38,830
Nordre Bergenhus.....	7,044	86,208
Romsdal.....	5,650	117,220
Søndre Trondhjem.....	7,081	116,804
Nordre Trondhjem.....	8,793	82,271
Nordland.....	14,660	104,151
Troms.....	10,156	54,019
Finmarken.....	18,302	24,075
Total.....	123,205	1,806,900

POPULATION OF PRINCIPAL TOWNS.—At a census taken Dec. 31, 1885, of the population of the towns, the number of towns with a population of above

100,000 was one, above 20,000 three, above 10,000 five, above 5,000 nine. The population of the principal towns, Jan. 1, 1886, was:

Kristiania.....	130,027	Fredrikshald.....	11,246
Bergen.....	47,075	Fredrikstad.....	11,212
Trondhjem.....	23,979	Larvik.....	11,196
Stavanger.....	23,911	Aalesund.....	6,889
Drammen.....	19,601	Tromsø.....	5,734
Kristiansana.....	13,022		

CENTRAL EXECUTIVE GOVERNMENT.—By the Treaty of Kiel, Jan. 14, 1814, Norway ceded by the king of Denmark to the king of Sweden; but the people of Norway did not recognize this cession until May 17 of the same year, when after failing in their efforts to secure independent sovereignty, they yielded to terms of agreement with Sweden, under the provision that the "independence of Norway in union with Sweden" was officially proclaimed. At an extraordinary meeting of the "storting" King Carl XIII. of Sweden was elected king of Norway. The following year a charter (the *riksakt*) was promulgated establishing new fundamental laws on terms of perpetual union with Sweden, declaring such union insoluble and irrevocable, yet without prejudice to the separate local government of each. The law of succession to the throne is the same in both countries. In case of absolute vacancy of the throne, the two diets assemble for the election of the future sovereign, and should they not be able to agree upon one person, an equal number of Swedish and Norwegian deputies have to meet at the city of Karlstadt, in Sweden, for the appointment of the king, this nomination to be absolute. The common affairs are decided upon in a council of state composed of Swedes and Norwegians. In case of minority of the king, the council of state exercises the sovereign power until a regent or council of regency is appointed by the united action of the diets of Sweden and Norway.

The last revision of the constitution of Norway was made in 1889. The legislative power of the realm continues to be invested in the "storting," or Great Court, which is declared to be the "representative of the sovereign people." The king of Sweden and Norway, however, possesses the right of veto over laws passed by the storting, but only for a limited period. The royal veto may be exercised twice; but if the same bill pass three storthings formed by separate and subsequent elections, it becomes the law of the land without the assent of the sovereign. The king has the command of the land and sea forces, and makes all appointments, but, except in few cases, is not allowed to nominate any but Norwegians to public offices under the crown.

The storting assembles every year. New elections take place every three years. The meetings take place *sou jure*, and not by any writ from the king or the executive. They begin in February each year, and must receive the sanction of the king to sit longer than two months. Every Norwegian citizen of twenty-five years of age who in the year before the election has paid income tax on an annual income of at least 500 kronen in the country districts or 800 kronen in the towns (provided that he has resided one year in the electoral district at the time when the election takes place, and that he does not belong to the household of another as a servant), or who is or has been a public functionary, or possesses property in land, or has been tenant of such property for five years at least, or is a burgess of any town, or possesses real property in a town to the value of 600 kronen, is entitled to elect.

Under the same conditions citizens thirty years of age, and settled in Norway for at least ten years, are entitled to be elected. The mode of election is indirect. Towards the end of every third year the people choose their deputies, at the rate of one to fifty voters in towns, where the election is administered by the magistrate, and one to a hundred in rural sub-districts, where they meet in the parish church under the presidency of the parish minister. The deputies afterwards assemble and elect among themselves, or from among the other qualified voters of the district, the storthing representatives. No election takes place for vacancies, which are filled by the persons who received the second largest number of votes. The number of electors in 1888 was 128,368, or 6.55 per cent. of total population, while 90,416 votes, or 70.4 per cent. of the whole number, were recorded. Of the total male population, 45 per cent. are 25 years of age and above. The storthing has 114 members—38 from towns, 76 from rural districts.

The storthing, when assembled, divides itself into two houses, the "Lagthing" and the "Odels-thing." The former is composed of one-fourth of the members of the storthing, and the other of the remaining three-fourths. The thing nominates its own presidents. If the odelsthing and lagthing do not agree, the two houses assemble in common sitting to deliberate, and the final decision is given by a majority of two-thirds of the voters. The same majority is required for alterations of the constitution. The storthing can also form itself into a high court of justice, for the impeachment and trial of ministers, members of the chief court of justice, and members of the storthing. While in session, every member of the storthing has an allowance of twelve "kronen" a day, besides traveling expenses.

The executive is represented by the king, who exercises his authority through a council of state, composed of two ministers of state and at least seven councillors. Two of the councillors, who change every year, together with one of the ministers, form a delegation of the council of state, residing at Stockholm, near the king. Ministers and councillors of state are entitled to be present in the storthing and to take part in the discussions, when public, but without a vote.

There are now (1891) eight council ministers at Kristiania, Norway, and a delegation of three located near the king at Stockholm, Sweden. All were appointed July 12, 1889.

REIGNING KING AND ROYAL FAMILY 1891.—Oscar II., born Jan. 21, 1829; the third son of King Oscar I. and of Queen Josephine, daughter of Prince Eugene of Leuchtenberg. Succeeded to the throne at the death of his brother King Carl XV., Sept. 18, 1872. Married June 6, 1857, to Queen Sophia, born July 9, 1836, daughter of the late Duke Wilhelm of Nassau.

CHILDREN OF THE KING.—1. Prince Gustaf, Duke of Wermaland, born June 16, 1858. Married Sept. 20, 1881, to Princess Victoria, born Aug. 7, 1862, daughter of the Grand Duke of Baden. Issue, Prince Gustaf Adolf, Duke of Scania, born Nov. 11, 1882; Prince Carl Wilhelm, Duke of Södermanland, born June 17, 1884; and Prince Erik Ludvig Albert, Duke of Vestmanland, born April 20, 1889. 2. Prince Carl, Duke of Westergötland, born Feb. 27, 1861. 3. Prince Eugene, Duke of Nerike, born Aug. 1, 1865. 4. Prince Oscar Bernadotte, born Nov. 15, 1859. Married March 15, 1888, to Ebba Munk of Fulkila, born Oct. 24, 1858.

King Oscar II. is the fourth sovereign of the House of Ponte Carvo, and grandson of Marshal Bernadotte, Prince de Ponte Corvo, who was elected heir-apparent of the crown of Sweden by the

parliament of the kingdom, Aug. 21, 1810, and ascended the throne Feb. 5, 1818, under the name of Carl XIV. Johan. He was succeeded at his death, March 8, 1844, by his only son, Oscar. The latter died July 8, 1859, and was succeeded by his eldest son Carl XV., at whose premature death, without male children, the crown fell to his next surviving brother, the present king.

The royal family of Sweden and Norway has a civil list of 1,338,000 kronen, or \$331,665, from Sweden, and 433,922 kronen, or \$120,430, from Norway. The sovereign, besides, has an annuity of 300,000 kronen, or \$83,330, voted to King Carl XIV. and his successors on the throne of Sweden.

FINANCE AND DEFENSE.—The government budgets for 1890 and 1891 fixed the revenue and expenditure of the two years respectively at 45,070,000 kronen and 48,350 kronen.

The army on Jan. 1, 1891, numbered 40,000 men with 850 officers. The number of troops of the line actually under arms can never exceed, even in war, without permission of the storting, 18,000 men. The king has permission to transfer from Norway to Sweden annually for "common military exercises" only.

The naval force of Norway in 1891 consisted of 48 steamers and two sailing vessels. One first-class gunboat was in process of construction, to be completed at a cost of 1,240,000 kronen; also one protective steel-deck vessel of 6 guns, and 6 revolving guns. All the seafaring men in the sea-ports between the ages of 21 and 35 are enrolled in either the active fleet or naval militia. They numbered in 1890 nearly 27,000 men.

NORWICH, the county-seat of New London county, Conn., at the head of the Thames River, thirteen miles north of New London. Population in 1890, 16,156. See *Britannica*, Vol. XVII, p. 596.

NOSING, the projecting edge of a moulding, such as the bead or bottle used on the edge of steps, to which the term is most frequently applied.

NOSOLOGY (Gr. *nosos*, "disease"), that branch of medicine which treats of the distribution and arrangement of diseases into classes.

NOSSI DAMBO, one of the native names of Madagascar.

NOSTALGIA (Gr. *nostos*, "the return home;" *algos*, "pain"), a technical term for home-sickness which, when as sometimes it takes the form of acute melancholia, becomes ruinous to health, and even fatal. It is said that inhabitants of mountainous countries suffer more keenly than others; but it seems to have less to do with affection for the physical features of home than with inability to break with old habits and modes of life. In armies it has been found necessary to adopt measures to prevent desertion on this ground. In Canada, the playing of *Lochaber no More* by the pipers of Highland regiments had to be interdicted; and so in France it was forbidden, under pain of death, to sing or play the *Ranz des Vaches* in the hearing of the Swiss mercenaries.

NOSTOC, a genus of plants of the natural order *Algae*, sub-order *Confervee*, found upon moist ground, rocks near streams, etc., and consisting of a somewhat gelatinous hollow tumid frond, filled with simple filaments resembling strings of beads. *N. commune* springs up suddenly on gravel walks and pasture grounds after rain. It is a trembling, gelatinous mass, often called Star Jelly, and vulgarly regarded, owing to the suddenness with which it makes its appearance, as having fallen from the skies, and as possessed of important medicinal virtues.

NOT GUILTY, the form of a verdict in a criminal prosecution, and also in some civil actions, when the jury find in favor of the defendant or accused party. The verdict is conclusive, and the accused cannot, in criminal cases, be tried a second time.

NOT PROVEN, a form of verdict in Scotch criminal trials, which implies that, although the prisoner has not been proved to be guilty yet neither has he been proved to be innocent. Its practical effect is the same as that of a verdict of "not guilty."

NOTT, ABRAHAM, jurist, born at Saybrook, Conn., in 1768, died at Fairfield, S. C., in 1830. He studied law at Camden, S. C., and was admitted to the bar of Columbia, S. C., in 1791. From 1800-1801, he served one term in Congress. After that he practiced his profession at Columbia with much success until 1810, when he was appointed law judge. On the organization of the court of appeals in 1824, Nott became its president, and held his office until his death. His son, HENRY JUNIUS NOTT (1797-1837), essayist, was born on the Pacolet River in South Carolina, in 1797, and admitted to the Columbia, S. C., bar in 1818. In 1821 he went abroad, and engaged in literary pursuits in Holland and France. During his absence he was elected professor of belles-lettres in the college of South Carolina, and on his return he filled that chair until 1834. He visited New York City in 1827. On his return voyage the vessel on which he was a passenger was wrecked off the coast of North Carolina, and he and his wife were drowned. He published *Novellettes of a Traveler* (2 vol. 1834). He was a popular and finished essayist, and a successful lecturer. Another son, JOSIAH CLARK NOTT, ethnologist, was born at Columbia, S. C., in 1804, and died at Mobile, Ala., in 1873. He obtained the degree of M. D. at Philadelphia in 1827, and acted thereafter as demonstrator of anatomy under Dr. Philip S. Physic, for 2 years. For some years he practiced his profession at Columbia, S. C., and at Mobile, Ala. In 1857 he was made professor of anatomy in the University of Louisiana; and in 1858 he established a medical college at Mobile. Nott published *Biblical and Physical History of Man; Physical History of the Jewish Race; Types of Mankind, and Indigenous Races of the Earth*. He held the theory of the diverse origin of the several races of mankind. Another son, GUSTAVUS ADOLPHUS NOTT (1810-1875), became professor of anatomy in the University of Louisiana in 1839, and of materia medica and therapeutics in 1848. He was a surgeon in the Confederate army. He died at Montgomery, Ala., in 1875.

NOTT, ELIPHALET, a clergyman, born at Ashford, Conn., in 1773, died at Schenectady, N. Y., in 1866. He studied theology, and was licensed to preach by the New London Congregational Association, which sent him as a missionary into the then half-settled part of New York State bordering on Otsego Lake. In 1798-1804, he was pastor of the first Presbyterian church at Albany, and in 1804 he was elected president of Union College, Schenectady, N. Y. Through his efforts the legislature passed a law in 1814, by which financial aid was afforded this then much indebted and poorly equipped college by means of a lottery, the management of which was confided to himself, and conducted by him for many years. As an educator Dr. Nott was very practical and greatly beloved by his students. A short time before his death he endowed the college with property worth \$500,000. As a preacher he was original, scholarly, and impressive. He paid much attention to physical science, especially to the laws of heat, and obtained about 30 patents for inventions

in that department. The most notable of these was for the first stove for burning anthracite coal, which bore his name, and was much used. Among his published writings are *Counsels to Young Men*, and *Lectures on Temperance, and Resurrection of Christ* (1872). His speech on the death of Alexander Hamilton has a national reputation. His brother, SAMUEL NOTT, D. D., was born at Saybrook, Conn., in 1754. He graduated at Yale in 1780, studied theology under Jonathan Edwards, and in 1781 became pastor of the Congregational church at Franklin, Conn., where he continued to labor until his death in 1852, a period of 71 years. At the same time he taught a boys' school.

SAMUEL NOTT, the son of the preceding, born at Franklin, Conn., in 1788. He studied at Andover Theological Seminary, and was in 1812 sent as missionary to India. Failing health compelled him to return in 1816. He afterwards held pastorates at Galway, N. Y., and Wareham, Mass., where he founded an academy in 1849. He conducted this school successfully for 16 years. He died at Hartford, Conn., in 1869. His publications include *Sixteen Years' Preaching and Procedure at Wareham; and Slavery and the Remedy* (1856).

NOUKHA, a town of Russia, in Trans-Caucasia, built on the southern slope of the Caucasus mountains, eighty miles southwest of Derbend. It consists of native Tartars belonging to the Mohammedan creed of Armenians, and a few Russians, chiefly officials. Breeding the silk-worm is the staple branch of industry. The native breed of silk-worms is somewhat coarse, and is now being supplanted by the Italian breed.

NOVA SCOTIA SHIP RAILWAY, a railway which is now (1891), in course of construction, and which will extend in a straight line between Chignecto Bay and Northumberland Strait, seventeen miles. It will raise and transfer a vessel and cargo of 2,000 tons dead weight in two hours, and save a distance of 500 miles.

NOVOROSSISK, a fortified port on the Black Sea, southeast of Anapa in Russian Caucasasia; the completion of a projected railway to Tzaritzin on the Volga would make it command the Volga trade. A breakwater and quay were begun in 1890. Population, 2,988.

NOYES, GEORGE RAPALL, Biblical scholar, born at Newburyport, Mass., in 1798, died at Cambridge, Mass., in 1868. He studied theology at Harvard College, and became Unitarian pastor at Peterham, Mass., in 1827. From 1840 until his death he was professor of Hebrew literature and other Oriental languages, and Dexter lecturer on Biblical literature at Harvard, where he received the degree of D. D., in 1839. Dr. Noyes was an eminent Greek and Hebrew scholar, and proficient in sacred literature. He devoted many years to the translation of the Old and New Testaments, to which he added copious notes. His chief works are: *An Amended Version of Book of Job; The Psalms; The Prophets; Theological Essays, Selected from Various Authors, and New Translation of the Old Testament*, published after his death (1869).

NOYES, JOHN HUMPHREY, communist, born at Brattleborough, Vt., in 1811, died at Niagara Falls, Canada, in 1886. He studied theology at Andover and Yale Seminaries, and was licensed to preach in 1833. While a theological student he fell under the influence of revivalist preachers, and in 1834 he experienced what he called "a second conversion." He then announced himself a "perfectionist," and his license to preach was annulled. In 1838 he established a communistic society at Putney, Vt., calling the members "perfectionists." But the force of public opinion drove him out in 1848,

when he removed with his followers to Oneida, in Madison county, N. Y., and established there what has since been known as the "Oneida Community." (See Britannica, Vol. XVII, p. 772). He established a second community at Wallingford, Conn., which obtained 40 members, whereas that of Oneida consisted of 235 members. They adopted what they called "complex marriage," lived in a "unity house," and engaged in farming and manufacturing, owning about \$500,000 worth of property. In 1882 the people of Madison county became aroused by their immoral practices, and forced the members to give up the practice of complex marriage and other obnoxious customs. After that they formed simply a business corporation. Noyes edited the "Oneida Circular" in 1834-40, in which he promulgated his views, and published *The Second Coming of Christ; Salvation from Sin; History of American Socialism* (1870), and several expositions of the practices in his community.

NUBAR PASHA, an Egyptian statesman, born at Smyrna in 1825 of an Armenian Christian family. He was educated in Switzerland and in France. In 1842 he became secretary of Bogos-Bey, who was then minister of foreign affairs in Egypt. Two years later he was made secretary-interpreter to Mehemet Ali, and afterwards to Ibrahim Pasha. In 1866 Ismail Pasha made him minister of foreign affairs, and sent him to Constantinople to obtain from the sultan the title of khedive for himself. Nubar Pasha's efforts were directed to introducing European customs into the administration of Egyptian affairs. But he was several times driven from office. In 1878 he became president of the Egyptian cabinet. But he had to resign after six months. In 1884 he was again called to the head of affairs, and his administration has since been more acceptable to the Egyptians than before.

NUISANCE: in law, any act, employment, structure or accumulation of matter that is prejudicial to health, offensive to the senses or obstructive to the exercise of personal or public rights or the enjoyment of property. It is public or private. A "public nuisance" annoys citizens in general, whole communities or neighborhoods, as offensive odors produced by certain manufactures, powder-mills and magazines of explosives in the midst of dwellings, houses of prostitution, noisy trades, uncensored exhibitions of showmen and mountebanks, the bathing in a river in sight of the neighboring houses, riotous sports involving a breach of the peace, letting dangerous animals run at large, permitting persons infected with contagious diseases to mingle with the public, bringing horses having the glanders into populous towns, etc. The locality has much to do with the question what constitutes a nuisance. A manufactory which might be a nuisance if situated among residences, may not be a nuisance if it is situated in the midst of many similar manufactories, or outside of a town. A "private nuisance" is one which causes special injury to one or more individuals, and therefore will sustain a private action. If a house is being built in such a way as to throw the rain-water on an adjoining house or lot, or into a passage-way, this constitutes a private nuisance. The same is the case if the right of way is being obstructed; if a franchise or personal privilege is interfered with, etc. Any nuisance injurious to property is of a private character. A market-gardener was damaged by noxious vapors issuing from neighboring gas-works. On bringing suit the gardener was awarded a perpetual injunction to restrain the further manufacture of gas in a manner injurious to his crops. Most unlawful annoyances from noxious odors, smoke, unhealthy exhalations, ear-piercing

noises, etc., are of the nature of private nuisances, and will be restrained by injunction at the instance of the person or persons injured by them. See *Britannica*, Vol. XVII, pp. 612, 613.

NULLA BONA, a legal phrase in England, descriptive of the return made to a sheriff, who in executing process against a debtor finds he has no goods.

NULLIFICATION: in the history of the United States, the action of the legislature of South Carolina in 1832, declaring certain acts of Congress unconstitutional and therefore null and void. See *Britannica*, Vol. IV, p. 683; Vol. XXIV, p. 472.

NUMISMATICS, the science of coins and medals. Among the North American Indians strings of beads made from shells were used as currency. They were called *wampum*. The general court of Massachusetts soon recognized this money and fixed an arbitrary rate of exchange. Six white beads made from the sea-conch, or three purple beads made from the muscle-shell were taken as equivalent to an English penny. Later four white and two purple ones were declared to have the same value. Musket balls were made legal tender for small amounts, and furs and peltry for large sums. The coins brought from England and Holland tended to flow back to Europe, and the remaining ones were insufficient for the needs of the colonists.

In 1652, therefore, the general court of Massachusetts established a mint in Boston, and John Hull, mint-master, struck silver shillings, six-pences and three-pences. All of these coins bore the device of the pine-tree. They were of the same fineness as the English coins of like denomination, but of less weight. This mint continued in operation for thirty-six years. After a while the "royal oak" was substituted for the pine-tree in order to conciliate King Charles II. who disliked this minting by a colony. All the above named coins bore the date of 1652. But two-penny pieces were added with the date of 1662. No other colony had a mint until 1659, when Lord Baltimore caused shillings, six-pences, and groats to be coined for use in Maryland. James II. issued ten coins for circulation in America, though few of these have found their way hither. In 1722, 1723, and 1733 copper coins were minted in England with the legend "Rosa Americana." There were also copper half-pence issued in 1773 for circulation in Virginia, and in 1774 silver shillings were added. Florida and Louisiana had colonial coins of their own, before they became parts of the United States.

After the Revolutionary war the Continental Congress passed an act in 1786 which established a mint and regulated the value and alloy of the national coin. The government prescribed the device for copper coin the next year. Under this authority the so-called "Franklin Penny," with the legend "Mind Your Business," was made by contract. By the Federal Constitution, ratified in 1789, the right of coining money was transferred from the States to the United States. Under this constitution the United States mint was established at Philadelphia in 1792, and the regular coinage began in the following year.

The following table gives the weight and fineness of all the denominations used in the United States. It also shows the dates of the various acts of Congress which authorized their issue. By the act of Congress establishing the United States Mint the following coins were authorized: *Gold*, eagle, half-eagle, quarter-eagle, *silver*, dollar, half-dollar, quarter-dollar, dime, half-dime; *copper*, cent, half-cent. Changes have been made at various times, not only in weight and fineness, but also in the metals used

for the minor coins. At present the following coins are struck: *Gold*, double-eagle, eagle, half-eagle, three-dollar, quarter-eagle, dollar; *silver*, dollar, half-dollar, quarter-dollar, dime; *minor coins*, of nickel and bronze, 5-cent, 3-cent, and cent.

By the act of Feb. 12, 1873, the metric system was to a certain extent used in determining the weight of the silver coins. Thus, the half-dollar was to weigh 12½ grams, the quarter-dollar 6¼ grams, the dime 2½ grams. In the following table these weights have been given in grains:

Coins.	Date of Law.	Weight, grains.	Fineness.
<i>Gold:</i>			
Double eagle.	March 3, 1849	516	900
Eagle.	April 2, 1792	270	916½
	June 28, 1834	258	899.225
	Jan. 18, 1837	258	900
Half-eagle.	April 2, 1792	185	916½
	June 28, 1834	129	899.225
	Jan. 18, 1837	129	900
Quarter-eagle.	April 2, 1792	87.5	916½
	June 28, 1834	64.5	899.225
	Jan. 18, 1837	64.5	900
3-Dollar piece.	Feb. 21, 1853	77.4	900
Dollar.	March 3, 1849	25.8	900
<i>Silver:</i>			
Dollar.	April 2, 1792	416	892.4
	Jan. 18, 1837	412½	900
Discontinued.	Feb. 12, 1873		
Reauthorized.	Feb. 28, 1878		
Trade-dollar.	Feb. 12, 1873	420	900
Demonetized.	July 22, 1876		
Half-dollar.	April 2, 1792	208	892.4
	Jan. 18, 1837	206¼	900
	Feb. 21, 1853	192	
	Feb. 12, 1873	192.9	
Quarter-dollar.	April 12, 1792	104	892.4
	Jan. 18, 1837	103½	900
	Feb. 21, 1853	96	
	Feb. 12, 1876	96.45	
20-Cent.	March 3, 1875	77.16	900
Discontinued.	May 2, 1878		
Dime.	April 2, 1792	41.6	892.4
	Jan. 18, 1837	41.25	900
	Feb. 21, 1853	38.4	
	Feb. 12, 1873	38.58	
Half-dime.	April 2, 1792	20.8	892.4
	Jan. 18, 1837	20½	900
	Feb. 21, 1853	19.2	
Discontinued.	Feb. 12, 1873		
3-Cent.	March 3, 1851	12½	750
	March 3, 1853	11.52	900
Discontinued.	Feb. 12, 1873		
<i>Minor Coins:</i>			
5-Cent (nickel).	May 16, 1866	77.16	75 per cent. copper, 25 per cent. nickel.
3-Cent (nickel).	March 3, 1865	30	75 per cent. copper, 25 per cent. nickel.
2-Ct. (bronze).	April 22, 1792	96	95 per cent. copper, 5 per ct. tin and zinc.
Discontinued.	Feb. 12, 1873		
Cent (copper).	April 2, 1792	264	
	Jan. 14, 1793	208	
	March 3, 1795	168	
Discontinued.	Feb. 21, 1857		
Cent (nickel).	Feb. 21, 1857	72	88 per cent. copper, 12 per cent. nickel.
Discontinued.	April 22, 1864		
Cent (bronze).	April 22, 1864	48	95 per cent. copper, 5 per ct. tin and zinc.
Half-cent (copper).	April 2, 1792	132	
	Jan. 14, 1798	104	
	March 3, 1795	84	
Discontinued.	Feb. 21, 1757		

Till 1837 the obverse had generally a female head, either with a liberty-cap, or with a fillet bearing the word "Liberty." Afterwards it was replaced by a full-length seated figure with a liberty-cap on a pole and a shield with a band inscribed "Liberty." The reverse of the principal coins has the eagle, often with a shield, arrows and olive

branch. But in the minor coins the denomination of the piece is encircled by a wreath.

Up to 1849 eagles or ten-dollar gold pieces were the highest denomination authorized. But the discovery of gold in large quantity in California caused a demand for a larger coin, and the double-eagle was authorized by act of March 3, 1849, and issued in 1850. By the same act gold dollars were also authorized. Beside the governmental issues there were octagonal and ring dollars and even gold half-dollars and quarters issued in California. The Mormons in Utah also had gold coins of their own. These had peculiar devices and their favorite inscription, "Holiness to the Lord." Although the United States Constitution prohibits coining by the States, it has been held that individuals may issue coins which are not similar to the national coinage. Such coins had been issued by Reed in Georgia in 1830, and by the Bechtlers in North Carolina in 1831, and for several years after this date. See *Britannica*, Vol. XVII, pp. 628-661.

NUNC DIMITTIS, the name given to the Canticle of Simeon (Luke ii. 29-32), which forms part of the compline office of the Roman Breviary, and is retained in the evening service of the Anglican Church when it follows the second lesson.

NUNDA, a village of New York on the Genessee Valley Canal, about 45 miles southwest of Rochester. It is the seat of an academy and of important manufacturing industries.

NUNDYDROOG (*Nandidrug*), a fortified hill in Mysore, 31 miles north of Bangalore, 4,810 feet above the sea. The extensive fortifications on the plateau-summit were erected by Hyder Ali and Tippoo Saib, and were stormed by a British force in 1791. The place is now used as a health resort by Europeans from Bangalore.

NURSERY RHYMES, metrical jingles transmitted in folklore and mechanically repeated by children at their play, without knowledge of their significance or origin. Many of them are survivals of May games, ring-songs and dances, rounds and kissing games which in old England were played by grown-up people, and some of these are still current in America, which are now forgotten in the mother-country, although they not infrequently have equivalents on the continent of Europe. Under the same general head we include nursery rhymes proper, counting-out rhymes, cumulative rhymes, courting and love games, playing at work, flower oracles and riddle and guessing games. The verses usually consist of a rhyming couplet, or of four lines in which the second and fourth rhyme; they are often accompanied by a refrain, which may be a single added line, or may be made up of two lines inserted into the stanza; and in place of exact consonance, any assonance or similarity of sound, will answer for the rhyme.

NURSING. See *Britannica*, Vol. XII, p. 305. Fifty years ago a well-trained and qualified nurse was almost unknown, and consequently, the care of the sick often devolved upon persons totally unfit for, and ignorant of, the duties required of them. That time is fortunately past. Well educated women are now to be obtained from various institutions at moderate rates; women who are regarded by medical attendants as most valuable assistants.

One of the earliest, if not the very first of the training institutions for nurses of a superior class, was the St. John's Sisterhood, founded in 1848 in London. It is now, with its affiliated institution, the Nursing Sisters of St. John the Divine, under the patronage of the archbishop of Canterbury, and has a very influential council or committee, and a large staff of nurses, some of whom are gra-

tuitously laboring amongst the poor. Much care is taken in their selection, and they are carefully trained.

After the Crimean war a great impulse was given to the movement in commemoration of the heroic self-denying labor of Miss Nightingale, and a fund was raised for the purpose of training hospital nurses. See NIGHTINGALE, FLORENCE, in these *Revisions and Additions*. In 1887 Queen Victoria devoted the surplus of the Women's Jubilee Offering, amounting to \$350,000, to the foundation of a scheme for the training of nurses. The interest of this sum, about \$10,000, is employed in the maintenance of central institutions, where nurses are trained for this special work. There are at present four of these centres, in London, Edinburgh, Dublin and Cardiff. Nurses who have gone through the required training at any of these Homes are eligible to be entered on the roll of the Queen's Institute, and are entitled to wear the badge as Queen's nurse.

The army and navy nurses of Great Britain must all be ladies of good social position, and require to undergo three years' training in a general hospital. They are called Her Majesty's Nursing Sisters, and may be ordered on active service in any war. As a reward for special service they receive the order of the Royal Red Cross. The Royal National Pension Fund, an insurance company for nurses, was founded in 1887. In 1889 four English gentlemen placed \$100,000 at the permanent disposal of the Fund, to afford nurses a safe means of providing an allowance during sickness, and a certain income when their strength is declining. On the continent of Europe the employment of male nurses to attend male patients is common, and in the Roman Catholic countries the nursing of the hospitals is for the most part in the hands of Sisters of Mercy. In Germany a great impetus was given to improvements in nursing by the interest shown in the matter by the late Empress Augusta, the Empress Frederick, and the late Princess Alice of Hesse. The training of nurses on the lines adopted in Great Britain was instituted in Paris during 1877, by the establishment of l'Ecole de Garde-malades et d'Ambulancières. In America the practice of nursing is very thoroughly taught in many of the hospitals, particularly those in the north-eastern States, such as the Bellevue Hospital in New York, the Long Island Hospital in Brooklyn, the Philadelphia and Pennsylvania hospitals in Philadelphia, and the Massachusetts General Hospital in Boston.

NUTE, ALONZO, an American manufacturer, born in Milto, N. H., Feb. 12, 1826. He received a common school education; and became an extensive manufacturer of boots and shoes at Farmington. He served with credit in the civil war; was a member of the New Hampshire house of representatives in 1866, and of the State senate 1867-68; was a delegate to the Cincinnati Convention in 1866; was elected to Congress from New Hampshire in 1888.

NUTTALL, THOMAS, naturalist, born at Settle, Yorkshire, England, in 1786, died at St. Helens, Lancashire, in 1859. He came to the United States in 1808 and explored both the Missouri and Arkansas rivers, the Everglades of Florida and the Great Lakes. In 1822 he became professor of natural history in Harvard University and curator of the botanical gardens there. He returned to England in 1842, and spent the rest of his life chiefly on the estate of Natgrove, near Liverpool, which had been bequeathed to him on the condition that he should reside on it. He published *The Genera of North American Plants*, and a *Catalogue of*

the Species; A Journal of Travels into the Arkansas Territory in 1819; Manual of the Ornithology of the United States and Canada, and The North American Sylva, or Forest Trees of the United States, Canada and Nova Scotia (3 vols. 1849).

NYACK, a village of New York, on the west bank of the Hudson, at the upper end of the Palisades, about thirty miles from New York. It is the headquarters of numerous manufacturing industries, is an important shipping point for fruit and milk, and is the seat of the Rockland Female Institute.

NYANGWE, an Arab trading station on the Upper Congo or Lualaba, at the edge of the Man-yema country, in 4° 20' south latitude. From that point Stanley commenced the descent of the Lualaba in 1876.

NYCTAGINACEÆ, a natural order of plants, consisting partly of herbaceous plants, both annual and perennial, and partly of shrubs and trees.

Some species have flowers of considerable beauty, as those of the genus *Mirabilis*, known as *Marvel of Peru*. *M. Jalapa* was at one time erroneously supposed to produce jalap.

NYCTALOPIA (Gr. *nyx*, "night;" *ōps*, "the eye"), the defective vision of persons who can see in a faint light but not in bright daylight; sometimes applied to the opposite defect, inability to see save in a strong daylight.

NYE, EDGAR WILSON, better known by his pen-name of BILL NYE, an American humorist, born in Shirley, Me., in 1850. He was educated in Wisconsin, and admitted to the bar in Wyoming in 1876. He early became connected with Western journalism, and subsequently settled, as a writer, in New York City.

NYKERK, or NIEUWKERK, a small town in the Dutch province of Gelderland, twenty-eight miles southeast of Amsterdam, and one and a half miles from the Zuyder Zee. Population, 7,599.

OAK—OBESITY

OAK, any tree or shrub of the genus *Quercus*, of the natural order *Cupuliferae*. About forty species are indigenous to the United States. The bark is of great value as furnishing tan for the use of the tanner. It yields a bitter extract named *quercin*, which is employed in medicine as a tonic and astringent. Coloring matter is also obtained from it, which is used in dyeing wool. The acorns are excellent food for swine. The dwarf chestnut oak, and several other North American species, produce edible acorns. The bark of the black oak of the United States yields the *quercitron* dye of commerce. The timber of most of the American oaks is valuable. The following are the most esteemed as timber trees: the white oak or Quebec oak (*Q. alba*), spread from the Gulf of Mexico to Canada; the over-cup oak (*Q. lyrata*), native of the southern States, occupying situations liable to inundation; the chestnut-leaved white oak (*Q. prinus*), also a native of the Southern States; the live oak (*Q. virens*), extending from the Gulf of Mexico as far north as Virginia, regarded as the most valuable of American oaks for shipbuilding; the red oak (*Q. rubra*), pretty generally distributed in the United States and in Canada, furnishing the red oak staves so much in demand in the West Indies.

Many other trees, not of the genus *Quercus*, bear the name oak popularly applied. Thus the poison oak (*Rhus Toxicodendron*), a shrub or small tree of North America, Indian oak (*Tectona grandis*), African oak (*Oldfieldia Africana*), and stone oak (*Lithocarpus javanensis*), which belongs to the same natural order as *Quercus*, are examples of the popular but erroneous use of the name oak. See Britannica, Vol. XVII, pp. 689-94.

OAK CREEK, a village of Wisconsin, on Lake Michigan, about nine miles south of Milwaukee. It contains an excellent school and manufactories of flour and baskets.

OAKDALE, a village of Massachusetts, about ten miles north of Worcester. It produces a variety of manufactures, including cotton and woolen goods.

OAKES, URIAN, D. D., born in England in 1631, died July 25, 1681. He graduated at Harvard College in 1649, and became a clergyman at Fitchfield, England, but in 1662 was silenced for non-conformity. Returning to Massachusetts, he became pastor of a church at Cambridge in 1671, took charge of Harvard College in 1675, and five years later was formally installed president of that college.

OAKHAM, a town of England, in the vale of Catmose, twenty-five miles northwest of Peterborough. The castle, every peer of which must forfeit either a horseshoe or a fine, is in ruins except the hall, used for county business. The town has manufactories of beer, boots, and hosiery. Population, 3,204.

OAKLAND, a beautiful city, the county-seat of Alameda county, Cal. Population in 1890, 48,590. See Britannica, Vol. XVII, p. 694.

OAKLEY, THOMAS JACKSON, LL. D., born in Dutchess county, N. Y., in 1783, died May 12, 1857. After graduating at Yale College he became a

lawyer at Poughkeepsie, N. Y., and in 1810 surrogate of Dutchess county. He was a member of Congress in 1813-15 and in 1827-29; a member of the New York assembly in 1815-16, and attorney-general of the State in 1819. He was appointed judge of the superior court of New York City in 1823, and became chief justice in 1846.

OAK PARK, a village of Illinois, on Des Plaines River, about nine miles west of Chicago. It contains numerous handsome suburban residences.

OATES, WILLIAM C., born in Pike (now Bullock) county, Ala., Nov. 30, 1835. He was self-educated; studied law, was admitted to the bar in 1858, and became a successful lawyer and business man; entered the Confederate army as captain of Company G, 15th Alabama infantry, in July, 1861; was appointed colonel in the provisional army of the Confederate States May 1, 1863, and was assigned to the command of his old regiment; the 48th Alabama regiment was also subsequently placed under his command; was wounded four times slightly and twice severely, losing his right arm in front of Richmond, August 16, 1864, in the twenty-seventh battle he was engaged in; was a delegate to the National Democratic Convention held in New York in 1868 which nominated Seymour for the Presidency; was a member of the Alabama house of representatives and chairman of the committee on ways and means at the sessions of 1870-'71 and 1871-'72; was candidate for the Democratic nomination for governor in 1872; was in the same year nominated for Congress; was a member of the constitutional convention 1875 and chairman of its judiciary committee; and was elected to Congress in 1881.

OAT, See Britannica, Vol. XVII, p. 696.

OBERLIN, a village of Ohio, about thirty-five miles west of Cleveland. It is the seat of Oberlin College, and contains a number of manufactories and many handsome public buildings. Population in 1890, 4,330.

OBESITY, PHYSIOLOGICAL TREATMENT OF. There are three sources from which the body derives its fat: first, from the splitting up of the albumen of the food; second, from the transfer of that fat ingested as food; and third, probably from fat formed from starches and sugars when these are taken in large quantities.

Up to quite recent times it was the general belief that the oxygen taken into the blood from the inhaled air was the direct factor concerned in the many chemical decompositions going on in the body. And, in consonance with this view, it was held that fat accumulated from more of it being formed than the oxygen could consume; either excess of food supply or deficiency of oxidation being ascribed as the causes of obesity.

But, simple as this hypothesis appeared, and satisfactorily as it seemed to account for many of the conditions whose existence it was called upon to explain, it has had—like so many plausible explanations—to be relegated to the limbo of errors. It is but another example of the observation to which all of us must have been often led, namely, that the most obvious and plausible explanations of natural phenomena are also almost invariably incorrect.

Indirection seems to be a basic principal in the operation of natural law—evolution furnishing its most magnificent example.

Following on the lines first laid down by Rudolph Virchow, that the cell is the somatic unit, we now know that all the metabolic phenomena of the economy have their seat in the cells; that all cells have inherent in them the power of splitting up relatively complex chemical compounds into bodies of simpler composition. And while we are as yet unaware of the processes by which the cell effects these decompositions, we do know that the oxygen in the tissues is but indirectly concerned in them. The body being but an aggregation of cells, other things being equal, the more cells an organism contains, the greater will be the amount of chemical change performed.

Certain external agencies have the power of modifying the chemical powers of the cells. Among those that diminish may be instanced quinine, alcohol, morphine, low temperature, and deficient food supply (including oxygen), while excess of food supply, the changes consequent to fever, high temperature, and muscular activity increase them.

Now, the disintegrability of the different classes of foods brought to the cells varies widely, and the causes of obesity, and its treatment on physiological grounds, can only be fully understood when these differences are known and given their due value.

Experiments have shown that of the three great classes of food the proteids, the carbohydrates and the hydrocarbons—the one most easily split up is that of the proteids. The carbohydrates are next in ease of decomposition, while the fats are most resistant.

If proteid food alone be ingested, the soluble albumen carried to the cells is there, in part, converted into the tissue albumen of the organ formed of the cells, and in part changed into fat and other products. All of which will tend to be split up into still simpler bodies till the power of the cells becomes exhausted.

If, now, in addition to proteids, fat be ingested, the decomposition of the proteids will go on as before, but the food fat, being more readily oxidizable than the tissue fat formed from the proteids, will shield the tissue fat from destruction, and, at the same time, preserve the tissue albumen from destruction as well.

Thus indirectly, and in a double way, the food fat leads to a storing up of fat. First, by affording a more easily oxidizable substance for the liberation of energy than tissue fat; and, secondly, by preserving the tissue albumen from destruction there results greater chemical activity of the cells, more active elaboration of the food albumen, and, as a result, both increased growth of the cells and increased manufacture and storage of the fat made from the albumen brought to them.*

An analogous process obtains when the carbohydrates, in their soluble form of glucose, are fed to the cells together with albumen. The sugar is more easily decomposed than the fat, and may, if present in sufficient quantities, so absorb the energies of the cells as to shield the cells and the fat from destruction, and thus give rise to an accumulation of the latter.

Rubner, working in Voit's laboratory, has determined that the following quantities of the food classes are equivalents—are *isodynamic*, as Voit terms it—that is, that in their decomposition into

carbonic acid and water each yields an equal quantity of energy measured by heat:

Fat.....	100 grammes.
Albumen.....	211 "
Starch.....	232 "
Cane Sugar.....	234 "
Glucose.....	256 "

Now it will be apparent, from an examination of this table, that an accumulation of fat will most readily occur when the diet contains an overplus of fat, because, while least in quantity, fat has the highest equivalent; next, when containing an overplus of albumen, and next of carbohydrates.

Suppose an individual required per day, to keep his fat and flesh unchanged,* 118 grammes of albumen and 259 grammes of fat, 118 grammes of albumen being equal to 18 ounces of meat.

Were he to take albumen alone, he would require per day 664 grammes of albumen to retain a constant weight. This amount represents six pounds of meat per day, a quantity impossible to consume, the intestinal canal being unequal to the task of digesting and absorbing so large an amount.

Were he still to take the original 118 grammes of albumen, and exclude all fat, 600 grammes—or $1\frac{1}{4}$ pound—of starch would have to be taken at the same time.

On a mixed diet of all three classes of food, he would take: 118 grammes of albumen, 100 grammes of fat, and 368 grammes of starch.

Any excess in any one of these three classes—supposing, of course, that the mode of life remains unchanged—must lead to an accumulation of fat in the body.

Now, ordinarily, of course, no man habitually eats meals composed either of any one, or even of any two of these food classes. But his diet will consist of the usual combination of all three. And while, therefore, it could hardly happen that an overplus of fat would form even were an individual confined to any two of these classes—for lack of appetite from too monotonous a diet would prevent it, if nothing else did—it can very well happen that on a mixed diet containing plenty of fat and starches, a little more albumen than is needed to maintain the equilibrium of flesh and fat may be ingested.

And it is the fat formed in the cells from this surplus albumen which—since it is protected from oxidation by the food fat and starches—accumulates little by little in the tissues, and gradually leads to obesity.

A man need not necessarily be a glutton to grow stout. It is the slight excess that may daily be taken in the food, which by a gradual increment stores up the fat in the tissues. Nor would even this be sufficient in all individuals. Certain contributory causes often exert a powerful influence in the genesis of obesity, and when these, from any reason, come into play, an individual may grow fat, though, as he will tell you, he eats even less than formerly.

Anything which lowers the oxidizing powers of the cells will have this effect, such as free use of alcohol, lack of exercise, living in close, hot rooms a diet whose insufficiency in albumen lowers the vital powers of the cells, various pathological conditions, such as heart disease and other causes of impaired circulation, chlorosis, etc.

And then—and to this cause the most marked cases of obesity are certainly chiefly due—we must not forget that some individuals have a predisposition, seemingly inborn and often inherited, to grow fat.

*This article is condensed from an able paper read by Walter Mendel, M. D., before the Section Theory and Practice of Medicine of the New York Academy, Jan 1, 1890.

*Voit: Ursachen der Fettablagerung. München, 1884.

It is a fault of the cells, analogous to those aberrations which in some persons produce more uric acid than in normal, which in others lead to glycosuria and diabetes, and in others, again, to the production of cystin. Other individuals, no matter how much they may eat, and how little they may exercise, never grow fat.

These same peculiarities show themselves in animals as well as in man. Whoever saw a fat greyhound or a lean pug dog?

Hence, in treating obesity the individuality of the patient must be kept well in mind. In general, we are inclined to associate with fatness a certain indolence of mind as well as of body, an inclination to be unenergetic and phlegmatic—as Prince Henry says to Falstaff: "Thou art so fat-witted with drinking of old sack, and unbuttoning thee after supper, and sleeping upon benches after noon." And yet it may well be questioned whether these qualities are not the effect rather than the cause of obesity. Many instances might be cited of stout men being the contrary in disposition. Two of the most shining examples of intellectual industry and acumen that now occur to me were very stout men, Gibbon and Buckle.

Nevertheless, we are inclined to associate leanness with a nervous, keen and intellectual temperament, activity of mind seemingly going most often with a condition allowing of activity of body. Shakespeare illustrates this popular feeling when he lets Cæsar say to Antony:

"Let me have men about me that are fat;
Sleek-headed men, and such as sleep o' nights;
Yond' Cassius has a lean and hungry look;
He thinks too much; such men are dangerous."

Having now reviewed the chief factors concerned in the manufacture and disposition of fat in the body, the means to be adopted for preventing an accumulation will have become evident.

Our aim must be to make the production not exceed the consumption, and where a surplus exists, consumption must for a time, exceed production.

In the great majority of cases (in spite of the protestations of fat people to the contrary), ingestion of too great a quantity, or of an improper quality, of food, often combined with too little exercise, is the cause of obesity.

It remains therefore, for us to suitably regulate the diet and exercise, bearing in mind that the change we wish to bring about, to be beneficial, must be gradual; that the cells must be educated by degrees to the new duties we wish them to perform; that anything approaching starvation—like the Banting cure—is to be condemned.

With regard to diet, it must be our general plan to give much albumen and relatively little non-nitrogenous food. And we do this in order, first, that the cells from the abundance of nourishment brought to them shall be capable of great chemical activity; and, secondly, that the tissue fat thus necessarily formed shall not be preserved from oxidation by the presence of the more readily oxidizable food fat and starches.

But we must always keep in mind that, as the fat of the body becomes by this process gradually reduced, the diet must undergo a corresponding change, more and more of the non-nitrogenous foods being allowed as the body grows relatively richer in albumen and poorer in fat. For, unless this be done, a point will be reached where not only the fat of the body, but the albumen as well, will be consumed, and the patient, after feeding thus on his own muscular and glandular tissues, will begin to complain of weakness and lassitude.

This is the error of the Banting cure, prescribed to Banting by Dr. Harvey, of London. Banting himself says he had to discontinue treatment every little while in order to regain strength. The Banting diet prescribes enormous quantities of albumen, with an almost total exclusion of fats and carbohydrates. As before stated, it is impossible for a human being to take sufficient meat, eggs, etc., to cover the destruction of fat necessarily occurring, hence the muscular tissues soon begin to waste as well.

Voit gives the following quantities as required for nourishment without the accumulation of fat:

	Albumen.	Fat.	Carbo-hydrates.	Fat Equivalent.
For a hearty workman.....	118	56	500	678
For a well-to-do doctor.....	127	89	362	576

And Oertel,* who has given the subject the closest of study, gives the following minimum and maximum amounts per day for reducing fat:

	Albumen.	Fat.	Carbo-hydrates.	Fat Equivalent.
Minimum.....	156	22	72	137
Maximum.....	170	44	114	173

In accordance with these figures he has prepared two diet lists, and the following diet list that I have made up as an average of his two, and also somewhat modified for American habits. But I must beg of you to bear in mind that such a list is only to serve as a *general guide* to the patient to whom it is to be given. No absolutely hard and fast rules can be laid down, and patients under treatment should be seen—and weighed—from time to time, increasing one kind of food and diminishing another as soon as occasion demands.

DIET LIST FOR REDUCING FAT.—Breakfast.—One cup (6 oz.) tea or coffee, with milk and sugar. Bread, 2½ oz. (2 or 3 slices). Butter, ½ oz. One egg or 1½ oz. meat. **Dinner.**—Meat or fish, 7 oz. Green vegetables, 2 oz. (spinach, cabbage, string beans, asparagus, tomatoes, beet tops, etc.). Farinaceous dishes, 3½ oz., potatoes, rice, hominy, macaroni, etc., or these may be omitted and a corresponding amount of green vegetables substituted. Salad, with plain dressing, 1 oz. Fruit, 3½ oz. Water, sparingly. **Supper or Lunch.**—Two eggs, or lean meat, 5 oz. Salad (radishes, pickles, etc.), ¾ oz. Bread, ¾ oz. (1 slice). Fruit, 3½ oz. Or fruit may be omitted and bread, 2 oz., substituted. Fluids (tea, coffee, etc.), 8 oz. No beer, ale, cider, champagne, sweet wines, and spirits. Claret and hock in great moderation. Milk, except as an addition to tea or coffee, only occasionally. Eat no rich gravies, and nothing fried.

Remember that your patients should always feel *better*—never worse—under treatment. That lassitude

* M. J. Oertel: Kreislaufs-Störungen, Leipzig, 1888

tude and fatigue are signs that the muscular tissue, as well as the fat, is being reduced, and that more non-nitrogenous food must then be allowed.

Above all, never yield to the wishes of the patient to grow thin *quickly*. All reforms to be lasting and beneficial must be slow in action, they must be the result of education, they must be a growth from within, not an impress from without. And the cells of the body, in their infinite diversity of occupation resembling the citizens of a State, can by slow degrees be habituated to better things, to change their vicious mode of action to one harmonious with the welfare of the commonwealth, and when this education has once been established, continuance becomes a mere habit.

In all that has been said, no allusion has been made to that form of obesity connected with heart disease. I have preferred to confine myself in this paper to the pure, uncomplicated type, hoping, perhaps, that in the discussion that may follow, this phase of the subject may be dealt with.

In conclusion, let me say that the ideas underlying this sketch of the physiological basis of the treatment of obesity have been taken from the writings of Voit, of Oertel, of Munk and Uffelmann, of Ebstein, and of others. See *Britannica*, Vol. VI., pp. 435, 436; Vol. VII., pp. 204, 205; Vol. XVIII., p. 389.

OBI, or OBEAH, a form of sorcery practiced by the negroes in Africa and the West Indies, and to some extent in the southern United States. Rags, feathers, bones, etc., are used as charms for the cure of diseases and the telling of fortunes, and poisons are made use of for the gratification of revenge. Obi men and women have great influence over the degraded of their race.

OBITER DICTUM, an incidental remark or suggestion made by a judge in disposing of a question. It does not form a part of his judicial decision of the essential point; but it is not unusual for reporters of decisions to refer to *dicta* in their abstracts of judicial opinions, and they frequently have much influence when emanating from a tribunal of high reputation.

OBLATES, the name of a class of religious bodies in the Roman Catholic church, which differ from the religious orders strictly so called in not being bound by the solemn vows of the religious profession. The institute of oblates was one of the many reforms introduced in the diocese of Milan by St. Charles Borromeo, towards the close of the 16th century. The members consisted of secular priests who lived in community, and were merely bound by a promise to the bishop to devote themselves to any service which he should consider desirable for the interests of religion. St. Charles made use of their services chiefly in the wild and inaccessible Alpine districts of his diocese. The oblates in the United States are numerous.

OBLIGATION, DAYS OF, holidays on which faithful Catholics are bound to abstain from servile work and hear mass. These are, for England and Wales, Circumcision, Epiphany, Ascension Day, Corpus Christi, SS. Peter and Paul, Assumption, All Saints, and Christmas Day. Scotland adds to these St. Andrews, and Ireland St. Patrick and the Annunciation.

OBOCK, a French possession on the African coast of the Red Sea, inside of Bab-el-Mandeb, and opposite Perim. Area, 2,300 square miles; population in 1886, 22,370.

OBLIUS, in zoölogy, a genus of Brachiopods of the family *Lingulidæ*, so named from the resemblance of the form of the shell to that of the small Greek coin. Several species occur in both upper and lower Silurian rocks.

O'BRIEN, LUCIUS RICHARD, born in the province of Ontario, Canada, in 1832. He was educated in Upper Canada College, Toronto, studied art and became a frequent contributor to exhibitions. He was instrumental in the founding of the art-school of the Ontario Society of Artists in 1872, and in 1880 was elected president of the newly-founded Royal Canadian academy of art, and became art editor of *Picturesque Canada*. His pictures have been of landscape or marine subjects exclusively, and his later work has been altogether in water colors.

O'BRIEN, WILLIAM, an Irish patriot and political leader, son of John O'Brien, of Mallow; born in 1852. He became a journalist, wrote for the "Free-man's Journal," and was prominently connected with "United Ireland." He entered parliament in 1883; represented successively Mallow, Tyrone and Cork; supported Mr. Parnell, and propounded the "plan of campaign." He was imprisoned under the Crimes' Act, escaped with Mr. Dillon to France and thence to the United States, whence, upon the rupture of the Irish parliamentary party, he returned to Great Britain and to jail.

OBSCURANTISTS, the name given to those who are supposed to look with dislike and apprehension on the progress of knowledge, especially to such as defend theological prejudices against what is believed to be scientific truth.

OBSERVATORY, a place for making observations upon any great class of natural phenomena. Of modern observatories, that at Cassel dates from 1561; Tycho Brahe's at Uranienburg from 1576; that of Greenwich was founded in 1675. The oldest in the United States is the Hopkins Observatory, Williams College, erected in 1836; now there are upwards of sixty, of which those of Washington and Harvard and the Lick Observatory are the chief. The highest in the world is that on Mont Blanc, at an elevation of 24,470 feet. Many public and private observatories are now existing in this and other countries. See *Britannica*, Vol. XVII., pp. 708-717.

OBSTETRICS, that branch of medical science and practice which is concerned with the study and care of women during the processes of pregnancy, parturition, and the puerperium, or lying-in. As a department of medical study it embraces the anatomy and physiology of the female organs of generation, the phenomena of conception and pregnancy, of labor, normal and abnormal, and of the puerperium and the return of the organs to their non-pregnant condition. Strictly speaking, these processes are normal and physiological, and in perfectly natural conditions require little or no skilled help or assistance. But, while theoretically this may be so, it is still the case that these processes each produce an effect on the female organism which results in great modifications of the ordinary vital functions, so that the condition is one of continued physiological tension, which at any moment may pass into a pathological or abnormal condition in which skilled assistance is of the utmost importance. There can further be no doubt that many influences at work in states of civilization tend greatly to increase the dangers of the reproductive process, so that the members of highly civilized communities are peculiarly liable to disaster; but at the same time the rudest savages are by no means free from these risks, and the care which most of them take of their women during pregnancy and parturition amply proves how conscious they are of this fact. The dangers with which the reproductive process is associated may be in some measure realized, when it is understood that during pregnancy women are liable to be af-

fectured by many of the ordinary diseases in an aggravated form, which may give rise to premature expulsion of the ovum—abortion—a process in itself attended by grave dangers; that during parturition the child may present some part of the body other than the head, causing increased difficulty, often impossibility of spontaneous delivery; that there may be some disproportion between the size of the child's head and the pelvis, due to disease or deformity; that from disease or exhaustion the uterus may be incapable of expelling its contents, that after the birth of the child the natural processes for checking hemorrhage from the site of the placenta may be at fault, or again the retention of a blood-clot or fragments of placenta may expose the patient to the risks of septicæmia or blood-poisoning. These are but a tithe of the dangers which surround the reproductive process, but they give an ample explanation of the existence of a science and art of obstetrics by which these and similar dangers may be obviated. With regard to parturition itself it may be noted that the great majority of labors (95 per cent.) are natural—that is the head presents, and they are spontaneously accomplished within twenty-four hours. But in civilized countries and under the best practice, it is estimated that one in 120 women dies within a fortnight after labor. See HISTORY OF MEDICINE in Britannica, Vol. XV, pp. 700-817. Since the revival of the study of anatomy and physiology the progress of scientific obstetrics has been steady and sure. Some of the great advances and discoveries on which the art rests are the re-discovery of pordalic versions or turning; the invention of the forceps; the employment of anæsthetics, and the use of antiseptics and the prevention of puerperal fever.

O'CALLAGHAN, EDMUND BAILEY, antiquarian and historian, born at Mallow, county Cork, Ireland, in 1797, died at New York City, in 1880. After completing his collegiate course he spent two years at Paris, and went to Quebec, Canada, in 1823. In 1834 he became editor of the "Vindicator" at Montreal, and in 1836 he was elected a member of the assembly of Lower Canada. After the insurrection of 1837 he removed to New York. In 1848 he was appointed keeper of the historical manuscripts in the office of the secretary of State at Albany, N. Y. In 1870 he removed to the city of New York, where he continued his historical work till his death. He has edited for the State the *Documentary History of New York* (4 vols.); *Documents Relating to the Colonial History of New York* (11 vols.); *Journals of the Legislative Councils of New York* (2 vols. 1861); *A Calendar of the Land Papers; The Register of New Netherland, and A Calendar of Historical Manuscripts in the Office of the secretary of State* (1865).

OCARINA, the recent Italian toy-instrument of flute-like sound, made of pottery, and shaped like the body of a bird (without head or neck):

OCCCLUSION, a term applied to the solution of a gas by a melted solid—as of oxygen by melted silver—which gas is given up by the melted material when it solidifies, so that in the case of silver the metal sometimes "spits" or gives off the gas in bubbles, thereby roughening its otherwise smooth surface. Sometimes the gas is absorbed or "occluded" (in a wider sense) even though the metal be not fused—for example, hydrogen gas by cold palladium, carbonic oxide by red-hot cast-iron.

OCCOM, SAMSON, an Indian preacher, born near New London, Conn., about 1723, died at New Stockbridge, N. Y., in 1792. He was converted to Christianity about 1740, and expressed the desire to become the religious teacher of his tribe. Rev.

Eleazar Wheelock educated him at his school at Lebanon, Conn. In 1748 Occom taught school at New London, but he soon went to Montauk, on Long Island, where he was first a teacher, then became a preacher among the Indians. In 1766 he accompanied Rev. N. Whitaker to England to procure funds for an Indian charity-school. He obtained over £10,000. These funds became the endowment of Dartmouth College. Occom preached afterwards to the Indians on Long Island; but in 1786 he removed to the Brotherton tract in Oneida county, N. Y. Later on he resided among the Stockbridge Indians, where he received a tract of land. He was the author of several hymns, and wrote also an account of the manners of the Montauk Indians.

OCCULTATION: in astronomy, the eclipse of a planet or of a fixed star by it passing behind some other of the heavenly bodies. In most cases the moon is the eclipsing body, but very rarely a planet occults a star.

OCCUPANCY, a legal term denoting one method of obtaining title to real and personal property, a notion derived from Roman law, and supposed to originate in laws of nature, especially in those things which are open to, and therefore presumably the property of, all. Such titles to land can only rise in special cases, one of which is the accretion of land from the ocean shore, a navigable stream, or a lake; another where a defect in law provides no legal owner for a given time. Several cases occur of possession by occupancy of personal property: one, that of capture in time of war, another that of finding, a third that of confusion through fraud, by mixing up goods with those of an innocent party, making the latter, where the goods cannot be separated one from the other, become sole possessor.

OCEAN CURRENTS, in the Atlantic, see Britannica, Vol. III, pp. 18-20; in the Pacific, see Britannica, Vol. XVIII, pp. 117-18; see also INDIAN OCEAN, NORTH SEA, etc.

OCEAN DEPTHS. Only within recent years, and chiefly in connection with the laying of telegraph cables from one continent to another, has attention been turned to the question of the depth of the sea and the form of its bed beyond the mere margin of its shores. The North Atlantic has now been sounded in many directions, so that a general plan of its trough can be made with some accuracy; elsewhere, as in the South Atlantic, the Indian Ocean and Pacific, accurate soundings are as yet few in number. The greatest depth yet found by trustworthy sounding does not exceed 27,930 feet (4,655 fathoms), a depth which was found by the scientific expedition sent by the United States in 1873, near the Kurile Islands, north of Japan in the Pacific. Greater depths than this may remain to be found in the still unsounded regions of the sea bed. Although no depth has yet been sounded that exceeds the greatest height known on the land, the average depth of the sea proves to be very much greater than the mean elevation of the land. The average depth of the North Atlantic amounts to about 12,000 feet, and there is every reason to believe that the Pacific and the other great oceans are not shallower than this.

Some other great ocean depths have recently been sounded. One of 4,475 fathoms was measured south of the Ladrone Islands; one of 4,561 fathoms north of Porto Rico; and two of 4,295 fathoms and 4,430 fathoms, respectively, to the south of the Friendly Islands, in lat. 24° 37' S., long. 175° 8' W.

The average depth of the sea is at least eight times the mean height of the continental land; and the oceanic water on the earth occupies fully eigh-

teen times as much space as the land which rises above its surface level. This contrast will be made more striking if we suppose that all the continents could be pared off from the globe at the line of the sea level and gathered up. If then this mass was thrown into the trough of the North Atlantic it would not half fill it up.

OCEAN GROVE, a Christian seaside summer resort 6 miles south of Long Branch, on the Atlantic coast, N. J., under the supervision of an association of 13 ministers and 13 laymen of the M. E. church, organized Dec. 22, 1869. The grove, embracing 350 acres, was purchased and laid out in lots and avenues, and has been made an attractive seaside summer home and resort for many thousands of people annually. Resident population, 1,500. Adjoining is Asbury Park, specially laid out for similar purposes, and also occupied by a large summer population.

OCEAN LIFE. See MARINE FAUNA AND FLORA, Britannica, Vol. XXI, p. 579. It was once generally believed that no animal life could exist in the deep parts of the ocean on account of the lack of food and light, and also on account of the immense pressure of the water there. Recent research, however, has disproved all this. The "Challenger," a vessel sent out by the British government in 1872, traversed the Atlantic ocean five times, and sailed over the Pacific in various directions. She dredged the depths of these two oceans over a total length of voyage of 69,000 miles, and returned in May, 1876, bringing an exceedingly rich zoological collection, which has been carefully worked up by noted specialists. On three occasions the "Challenger's" dredge reached a depth of over 3,000 fathoms (about three-and-a-half miles), and in every case living forms were brought up from this extreme depth. The deepest sounding made was 4,575 fathoms. Since then three Norwegian expeditions were sent into the northern seas, and explored the latter with dredges, in 1876-78. The French ship "Talisman" explored in 1883 the Atlantic from Morocco to the Azores, and yielded highly valuable results. The Americans have been equally active.

From 1877 to 1880 the American steamer "Blake" made many deep-sea explorations in the West Indies and parts of the Gulf of Mexico. These researches were under the direction of Alexander Agassiz. Their results were published in two highly interesting volumes. Since that time the "Albatross" was equipped as a deep-sea dredger, and has been engaged in exploration work in the Atlantic and Pacific oceans.

ANIMAL LIFE EXISTS AT GREAT DEPTHS.—These explorations have established the fact that animal life exists in abundance at the greatest depths hitherto examined, and that every order of marine animals below the air-breathers is represented in the abysses of the ocean, the variety of species being possibly as great there as near the surface. Among the specimens brought up by the dredge or trawl are corals, sponges, annelids, echinoderms (sea-urchins), crustacea, mollusks, and fishes. Fishes have been caught at a depth of 2,900 fathoms. They probably reach as low as the other marine animals. There is some reason to believe that life is confined to the surface and the bottom regions, and that the intermediate zone is barren. The most abundant organic deposits on the ocean bottom are made by very minute creatures, the Radiolaria and Foraminifera. Their remains form a thick layer of calcareous ooze, which is inhabited abundantly by shell animals. In the regions of the bottom which are without this ooze, the animal forms are chiefly those without shells, such as the Annelida and Holothuroidea.

The deep sea does not yield many relatives of the animals of past geological ages, as it was expected it would, but animals approaching the surface forms in character, with many indications that they are descended from the surface forms. The range and variety of deep-sea fishes are, indeed, very great. Yet, certain forms which live in shallow water in some regions, have been dredged from the greatest depths in others. Most deep-sea fishes are of a dark color, very few are pink, and fewer yet are silvery. But many deep-sea crustaceans are of brilliant red hues; and the mollusks show a considerable variety of hues. Some of these animals display features of protective mimicry, and others have habits of burrowing themselves in the bottom ooze.

FOOD OF THE DEEP-SEA ANIMALS.—The food-supply of deep-sea animals has long been a mystery. The active carnivorous forms, which include all the fishes, find an abundant supply in the more sluggish creatures which exist in large numbers. But the basis of all animal life must be a vegetable diet, and there are no plants growing on the bottom of the ocean. Plants need sunlight for their growth. Now, it was found that the animals living on the surface, and the minute algae which exist abundantly in the surface waters, commence to sink to the bottom as soon as they die, and that there is a continuous rain of dead sea-animals and sea-plants descending to the ocean floor. The nutrient material which they contain, does not readily decompose in the sea-water, but remains long fit for food. It furnishes the food-supply for the sluggish animals at the bottom of the sea, and the latter, in their turn, yield food for the more active carnivora there. The plant-life of the surface is therefore, the basis of the food of the deep-sea animals.

The absence of sunlight does not seem to hinder the growth of the deep-sea animals. Neither does the enormous pressure of the water. At 1,000 fathoms this pressure is about one ton per square inch, and at the lowest depths yet explored it is from three to four tons. This enormous pressure can only be sustained because the animals' tissues are permeated with fluids under the same pressure, whereby an equilibrium between the inward and outward pressure is produced, so that the great pressure of the water is not felt. The tissues of these animals are very fragile and their bones light and soft, being nearly destitute of calcareous material. When deep-sea fishes are brought up to the surface, they are very often in a dilapidated condition.

As to the structure of the deep-sea fishes, many are found which have the head or the jaw enormously developed, while the body is reduced to the form of a ribbon. Yet, they are not new orders of fishes, but simply modified varieties of surface types. As a rule, deep-sea animals have unusually large eyes, and many of the animals are phosphorescent, so as to diffuse a feeble illumination around themselves. The luminous organs are most probably used to aid them in the search for their food. As there are many of these self-luminous animals at the bottom of the sea, the ocean abysses are probably not so very dreary abodes as might be supposed.

NORTH ATLANTIC LANES OF NAVIGATION.—1. From New York to the English Coast.—The quickest route from New York to London or Liverpool would be to follow the course of the gulf stream; but by taking this route very heavy weather is likely to be encountered about the time of the equinoxes, and from July to October. For small and weak vessels it is best to keep outside of the gulf stream at the times mentioned.

Lieut. Maury's tables strongly indicate a preference for the following lanes of travel during the months placed opposite. The figures give the North latitude:

January.....	40° 28' to 50° 38'	July.....	40° 27' to 50° 30'
February.....	40° 27' to 50° 50'	August.....	40° 27' to 49° 23'
March.....	40° 27' to 50° 44'	September.....	40° 27' to 50° 33'
April.....	40° 27' to 49° 30'	October, No-	
May.....	40° 27' to 50° 16'	vember and	
June.....	40° 8' to 50° 40'	December.....	40° 27' to 50° —

The distance to be run to reach the English channel by the above route is about 3,200 miles. From New York to Queenstown it is 2,795 miles, and from New York to Liverpool 3,078 miles. During the months of January, February and March icebergs may sometimes be met with in the above latitudes.

2. From the *English Coast to New York*.—The passage from England to New York is difficult and dangerous, especially in winter. The route most favorable to vessels bound eastward is the most unfavorable to vessels going west. The difficulties are increased by the fogs and storms, to which vessels are exposed when they come near Newfoundland and the coast of America. The more northern route should be taken, principally from October till March; and the more southern route in the fine weather season, that is, from April till October. The route from Europe to Newfoundland should be as nearly as possible on the arc of a great circle drawn between the point of departure and Cape Race, lying as far north as 50 degrees.

OCEAN ROUTES AND RECORDS.—The fastest Atlantic Ocean Passages on Record are:

Route.	Steamer.	Line.	Date.	D.	H.	M.
Queenstown to New York*	Teutonic.	White Star.	Aug. 13-18, 1891.	5	16	31
Queenstown to New York.....	Majestic.	White Star.	Aug. 5, 1891.	5	18	8
Queenstown to New York.....	City of Paris.	Inman.	Aug. 21-28, 1889.	5	19	18
New York to Queenstown.....	City of Paris.	Inman.	Dec. 25-31, 1889.	5	22	50
Southampton to New York.....	Columbia.	Hamburg.	June 6-12, 1890.	6	15	51
New York to Southampton.....	Columbia.	Hamburg.	Oct. 9-15, 1890.	6	15	23
Havre to New York.....	La Champagne.	French.	July 31- , 1886.	7	1	—
New York to Havre.....	La Bourgogne.	French.	Sept. 21- , 1889.	7	7	30

*On one day during her voyage the Teutonic made 517 miles from noon to noon, which is the highest performance ever made by an Atlantic steamer. For the route from Queenstown to New York the time is calculated from Roche's Point, near Queenstown, Ireland, to Sandy Hook Lightship, N. Y.

BEST RECORDS OF OTHER LINES.

Route.	Steamer.	Line.	Date.	D.	H.	M.
New York to Southampton.....	Lahn.	North Ger. Lloyd.	Oct. 2-9, 1889.	6	23	18
Southampton to New York.....	Lahn.	North Ger. Lloyd.	Aug. 22-29, 1889.	6	22	42
New York to Queenstown.....	Alaska.	Guion.	Sept. 12-19, 1882.	6	16	37
Queenstown to New York.....	Etruria.	Cunard.	Sept. 1-7, 1889.	6	1	50
New York to Queenstown.....	Umbria.		Nov. 12-18, 1889.	6	8	4

Approximate distances: Sandy Hook (Light Ship), New York, to Queenstown (Roche's Point), 2,800 miles; to Southampton, 3,100 miles; Havre 3,170 miles.

OCHTERLONY, SIR DAVID, a British general, born of Scottish descent, at Boston, Mass., Feb. 12, 1758, died at Meerut, July 15, 1825. He went to India as a cadet at eighteen, and was made lieutenant-colonel in 1803. In the following year he defended Delhi against Holcar; but his greatest services were rendered against the Goorkhas. In 1814 he stormed their hill-forts one after the other, and compelled them to sue for peace; on the renewal of the war in 1815 he shut up their principal chief in the hill-fort of Malaun, forced it to surrender, and penetrated to within a few miles of the

Napalese capital. Peace was again made; and the treaty has remained in force down to the present time. Ochterlony was made a baronet for his success. He rendered excellent service in the Pindari and Maharratta wars of 1817 and 1818.

O'CONNOR, or O'CONNOR, CHARLES, born in New York City, Jan. 22, 1804, died in Nantucket, Mass., May 12, 1884. Commencing the practice of law at an early age, his life was devoted to the pursuit of his profession, in which he became eminent. Among his celebrated private cases were the Slave Jack case in 1835, the Lispenard will case in 1843, the Lemon slave case in 1856, the Parrish will case in 1862, and the Jumel suit in 1871. Throughout the civil war he sympathized with the Southern States, and he became counsel for Jefferson Davis when he was indicted for treason. The suits against William M. Tweed were largely his work. In 1868 he was nominated for the presidency by the extreme Democrats. He became president of the Law Institute of New York in 1869.

O'CONNOR, THOMAS POWER, an Irish author and a statesman, born at Athlone in 1848. He graduated at Queen's University, and early engaged in literary work in Dublin and London. He entered parliament in 1880, representing Galway to 1885, and Liverpool to the present. He took a prominent part in defense of Home Rule; and in 1881 visited the United States in behalf of the Land League. He became president of the National League in Scotland and England. In 1888 he founded in London "The Star," an enterprising radical evening paper. His writings include *Lord Beaconsfield; a*

Biography; Gladstone's House of Commons; The Parnell Movement; Dead Man's Island, and many tales and essays.

OCONOMOWOC, a city of Wisconsin, and a noted summer resort, about 30 miles west of Milwaukee. It is the seat of a young ladies' seminary, and has a thriving local trade. It is beautifully situated on Oconomowoc Creek, and is surrounded by many charming lakes. Population in 1890, 2,660.

OCONTO, the county-seat of Oconto county, Wis., on Green Bay, at the mouth of the Oconto River, 149 miles north of Milwaukee. It has large steam sawmills, and exports pine lumber. Population in 1890, 5,221.

OCTOPODIDÆ, a family of cephalopods, of which *Octopus* is the typical genus. The body is oval and

finless, and the mantle is separated by fleshy bands. Some of the species attain a very large size.

OCTROI, a term which originally meant any ordinance authorized by the sovereign, and thence came to be restrictively applied to a toll or tax levied at the gates of cities, particularly in France and some other countries of northern Europe, on articles brought in. The octroi was abolished in France at the Revolution, but in 1798 it was re-established.

OD, the name given by Baron Reichenbach to a peculiar physical force which he thought he had discovered, intermediate between electricity, magnetism, warmth, and light. This force, according to him, pervades all nature, and manifests itself as a flickering flame or luminous appearance at the poles of magnets, at the poles of crystals, and wherever chemical action is going on. All motion generates od; and all the phenomena of mesmerism are ascribed to the workings of this od-force.

ODELL, a village of Illinois, about ten miles northeast of Pontiac. It is the trade-center of a thriving agricultural district.

ODENWALD, a mountainous system partly in Baden and Bavaria, but mainly in Hesse.

ODIN, a village of Illinois, about eight miles north of Centralia. It is the seat of an academy and contains a variety of important manufactories.

O'DONNELL, JAMES, born at Norwalk, Conn., March 25, 1840. He removed with his parents to Michigan in 1848; enjoyed no educational advantages, but after commencing to learn the printer's trade in 1856 made up this deficiency by study after working hours. At the breaking out of the war he enlisted as a private in the 1st Michigan Infantry, and served out his time, participating in the first battle of Bull Run. He was elected recorder of the city of Jackson for four terms, 1863-66; established the "Jackson Daily Citizen" in 1865, and has owned and edited the same since; was Presidential elector in 1872, and was designated by the State Electoral College as messenger to convey the vote of Michigan to Washington; was elected Mayor of Jackson in 1876, and was reelected in 1877; was appointed in 1878 as aid-de-camp on the staff of Governor Croswell, with the rank of colonel; and was elected to Congress in 1885.

O'DONOVAN, JOHN, an Irish archaeologist, born at Atateamore, county Kilkenny, July 9, 1808, died at Dublin Dec. 9, 1861. He was for some time employed in the historical department of the ordnance survey of Ireland; was called to the bar in 1847, but never practiced; and became professor of the Irish language, history, and archaeology at Queen's College, Belfast, in 1849. He published a *Grammar of the Irish Language*, edited *The Book of Rights*, and *The Annals of Ireland*, and aided Professor O'Curry in editing the *Brehon laws*.

ODONTOPTERIS, a genus of fossil ferns occurring in the Carboniferous rocks of various parts of Europe and many localities in the United States. Both *Odontopteris* and the closely allied *Neuropteris* had fronds of great size.

ODONTORNITHES, extinct toothed birds from the Cretaceous strata of North America. There are two distinct types—Ichthyornis and Hesperornis. The former and its relative Apatornis were small tern-like flying birds, with teeth in sockets, and with biconcave vertebrae. But Hesperornis was a large bird, about six feet long, with utterly degenerate wings and obviously incapable of flight. According to Marsh, to whom our knowledge of these forms is chiefly due, it was a consummate diver, even more aquatic than the penguin. The teeth were set in grooves, the vertebrae saddle-shaped. "A bird indeed," Stejneger

er says, "but a kind of swimming, loon-like rap-torial ostrich, without fore-limbs, with the gape armed with formidable rows of strong teeth like a gigantic lizard, and with a large, broad, and flattened tail like a beaver."

EDEMA is the term applied in medicine to the swelling occasioned by the effusion or infiltration of Serum into Cellular or areolar structures. The subcutaneous cellular tissue is the most common seat of this affection. (Edema is not a disease, but a symptom, and often a symptom indicating great danger to life.)

EHLE, GUSTAV FRIEDRICH, one of the greatest Old Testament scholars of the nineteenth century, born at Ebingen, June 10, 1812, died at Tübingen, Feb. 19, 1872. He studied at Tübingen, labored as a teacher at Basel and Tübingen, became in 1840 professor in the theological seminary in Schöndal, and in 1845 ordinary professor of theology at Breslau. In 1852 he was called to Tübingen to be head of the theological seminary. The chief books of this learned and reverend scholar were *Prolegomena zur Theologie des Alten Testaments*; *Die Grundzüge der Alt-testamentlichen Weisheit*; *Über das Verhältniss der A. T. Prophetie zur heidnischen Mantik* (1861); *Theologie des Alten Testaments*, and *Lehrbuch der Symbolik*.

ENOTHERA, a genus of ornamental plants of the natural order *Onagraceæ* related to the *Fuchsia* though strikingly dissimilar in general appearance. The Evening Primrose (*E. biennis*), a native of Virginia, is naturalized in many parts of Europe. The flowers are fragrant in the evening. The root somewhat resembles a carrot in shape, but is short; it is usually red, fleshy, and tender, and is eaten in salads, or in soups, and as a boiled vegetable. This and numerous other species of *Enothra*, chiefly of North America, are very generally cultivated in English flower gardens.

EREBRO, a town of Sweden, at the entrance of the Svarta into the Hjelmars Lake, 170 miles west of Stockholm. It has an ancient castle, in which many diets have been held; and there is a trade in minerals and matches. Population, 13,618.

OERSTED, ANDERS SANDØE, a Danish naturalist, born in Rudkjøbing, June 21, 1816, died in Copenhagen, Sept. 3, 1872. He was reared by his uncle, Hans Christian Oersted, the famous chemist, and in 1837 became professor of natural history in Copenhagen. In 1845 he began to study the geography of Central America, and in pursuit of his investigations visited the West Indies and Central America in 1845-48. He was the author of *Plantæ rigetis natur historie*; *Groenlandiæ annulata dorsibranchiata*, and *L'amerique Centrale, recherches sur sa flore et sa géographie physique*.

OERSTED, HANS CHRISTIAN, a Danish physicist, born at Rudkjøbing, on the Island of Sangeland, in 1777, died at Copenhagen in 1851. He was the son of an apothecary, and at an early age began to make chemical experiments. He studied medicine at Copenhagen. In 1799 he received the degree of Ph. D., after writing a dissertation on the thesis, "Architectonics of Natural Metaphysics," which was a philosophical consideration of the laws of the natural world. In 1801, Oersted traveled in Germany, Holland, and France, and on his return in 1803 he lectured at Copenhagen on galvanic electricity and kindred subjects. In 1806 he was appointed extra-ordinary professor of physics. His lectures attracted a great deal of attention. He had long held the idea that electricity and magnetism are connected together, and in 1819 he succeeded in proving that every electric current is accompanied by magnetism surrounding the current-bearing conductor. This discovery gave him a foremost

place among the physicists of his time, and made him the father of the science of "electro-magnetism." Ørsted held numerous scientific appointments and honorary offices and distinctions. His labors to popularize science in Denmark resulted in the establishment of a polytechnic school at Copenhagen, of which he was director from 1829. He also founded the Magnetic Observatory of Copenhagen. The fiftieth anniversary of his doctorate was celebrated in 1850 with a national jubilee. His most important works are *Naturlærens Mechaniske Deel* (1845), and *Aanden i Naturen* (the Soul in Nature). His brother, ANDERS SANDØE ØRSTED (1778-1860), was a celebrated jurist, and became prime minister of Denmark in 1853. He was the author of some philosophical works.

OETINGER, CHRISTOPH FRIEDRICH, a theosophic theologist, born at Göppingen in 1702, died at Murrhardt, Feb. 10, 1782, after holding various cures. His sermons were published in 1857 and his collected works in 1858-67. His system has been described as lying between Jacob Boehme and Shelling.

OFFICE: in law, the right and duty of a person to exercise the duties of a position of public or private trust and to receive the compensation belonging to it. Public offices are judicial or ministerial, or partly judicial and partly ministerial. Judicial offices are those which relate to the administration of justice. Ministerial offices involve obedience to the mandates of a superior. The incumbent of a ministerial office, as for instance, a sheriff or the clerk of a county, may discharge his duties by a deputy; but a judicial officer, as the judge of a court, cannot act by deputy. The public, in electing him, rely on his personal skill and judgment. Political offices, as that of a president, congressman, governor, etc., are not directly connected with the administration of justice, nor with the execution of the mandates of a superior. The incumbents are indirectly responsible to the voters who elect them. Military offices are such as are held by soldiers or sailors for military purposes.

In some instances an office is held by a number of persons. In this case it is a common rule that, though all should meet to discharge the common duty, a majority may act in the name of all. In private business all must both meet and concur in a conclusion, if the concern is not incorporated. But in a public board the statutes provide that if a majority of the members be present, they constitute a legal quorum.

The same person may hold an office under the State government, and also one under the United States Government, or he may hold two or more offices under the same government. But one man cannot be both judge and sheriff at the same time. The legislature in the one case, and the Congress in the other has the power to declare what office is inconsistent with the enjoyment of another, or that a person holding a United States office shall not hold a State office, or *vice versa*. According to the Constitution of the United States, Article VI, § 2, no Senator or Representative can hold another office under the United States Government. By accepting any other office during his term he forfeits his seat. By an act of Congress passed during the administration of President Monroe and still in force, the term of many United States officers, including collectors, certain grades of postmasters, etc., is fixed for four years; yet they may be removed sooner by the President. An act passed March 2, 1857, during the administration of President Johnson, provided that every person holding a civil office to which he had been appointed by and with the advice and consent of the Senate, shall be

entitled to hold such office until a successor shall have been appointed in like manner and duly qualified. This act was repealed by one passed in 1886, which gives the President full authority to over appointments and removals of United States officers, as he always had from the formation of our government until 1867.

OFFERTORY, that portion of the public liturgy of the Roman Catholic church with which the eucharistic service, strictly so called, commences. This offering of the bread and wine in the public service became, from a very early period, the occasion of a voluntary offering, on the part of the faithful; originally, it would seem, of the bread and wine designed for the eucharistic celebration and for the communion of the priest and congregation. By degrees other gifts were superadded to those of bread and wine—as of corn, oil, wax, honey, eggs, butter, fruits, lambs, fowl, and other animals; and eventually of equivalents in money or other objects of value. The last-named class of offerings, however, was not so commonly made upon the altar and during the public liturgy as in the form of free gifts presented on the occasion of other ministerial services, as of baptism, marriages, funerals, etc.; and from this has arisen the practice in the Roman Catholic church of the mass-offering, or *honorarium*, which is given to a priest with the understanding that he shall offer the mass for the intention of the offerent.

OFFICIAL PLANTS, those medicinal plants which have a place in the pharmacopœias of different countries, and which are therefore sold—or some of their products or preparations of them—by apothecaries and druggists. The medicinal plants cultivated to any considerable extent are all official, but many are also official which are not cultivated.

OGDEN, a city, the county-seat of Weber county, Utah. Population in 1890, 14,919. See Britannica, Vol. XVII, p. 732-33.

OGDENSBURG, a city of New York. Population in 1890, 11,667. See Britannica, Vol. XVII, p. 733.

OGLESBY, RICHARD JAMES, born in Oldham county, July 25, 1824. Left an orphan at eight years of age, he removed to Decatur, Ill., in 1836, learned the carpenters trade and while employed at that and rope-making studied law, and in 1845 was admitted to the bar. Commissioned first lieutenant in the 4th Illinois regiment in 1846, he participated at Vera Cruz and Cerro Gordo. In 1847 he resumed practice at Decatur, and pursued a course of study at Louisville Law School, graduating in 1848. He subsequently spent three years in California, returned to Decatur, was elected to the State senate in 1860, but resigned to accept the colonelcy of the 8th Illinois volunteers. He commanded a brigade at the capture of Forts Henry and Donelson, was made brigadier-general in March, 1862, was severely wounded at Corinth, and in November, 1862, was promoted major-general. He resigned in May, 1864, and in the following November was elected governor of the State; was reelected in 1872, but chosen United States Senator in 1873, and served through the term ending in 1879; and was again elected governor of Illinois in 1884.

OGYIA, a genus of Trilobites, peculiar to the lower Silurian system.

O'HARA, THEODORE, the author of *The Bivouac of the Dead*, born at Danville, Kentucky, in 1820, died in 1867. He was a lawyer and journalist, but served as captain and major in the Mexican war, afterwards, for a year, in the United States cavalry, and in the civil war as a colonel on the Confederate side.

OHIO, STATE OF. For general article on Ohio, see Britannica, Vol. XVII, pp. 734-738. The census of 1890 reports the area and population as follows: Area, 41,060 square miles; population, 3,672,316, an increase during the decade of 474,254. Capital, Columbus, with a population of 90,398. The following table gives the population of the cities and towns which in 1890 had each over 8,000 inhabitants; also the population of each in 1880, and the increase during the decade.

Cities and Towns.	Population.		In-crease.	Per cent.
	1890.	1880.		
Akron.....	27,601	16,512	11,089	67.16
Ashtabula.....	8,838	4,445	3,893	87.58
Bellaire.....	9,934	8,025	1,909	23.76
Canton.....	26,189	12,258	13,931	113.65
Chillicothe.....	11,286	10,938	348	3.20
Cincinnati.....	296,908	255,199	41,769	16.37
Cleveland.....	261,353	169,146	101,207	63.20
Columbus.....	90,390	51,647	38,743	71.68
Dayton.....	61,220	38,678	22,542	58.28
Delaware.....	8,224	6,849	1,375	.20
East Liverpool.....	10,565	5,568	5,888	96.77
Findlay.....	18,553	4,633	13,920	300.45
Hamilton.....	17,565	12,422	5,443	49.90
Ironton.....	10,939	8,857	2,082	23.51
Lima.....	15,987	7,567	8,420	111.27
Manassah.....	13,473	9,859	3,614	36.66
Marietta.....	8,272	5,444	2,829	51.97
Marion.....	8,327	3,899	4,428	113.57
Massillon.....	10,092	6,836	3,256	47.63
Newark.....	14,270	9,600	4,670	48.68
Piqua.....	9,090	6,031	3,059	50.72
Portsmouth.....	12,394	11,321	1,073	9.48
Sandusky.....	18,471	15,838	2,633	16.62
Springfield.....	31,895	20,730	11,165	53.86
Steenberville.....	13,394	12,093	1,301	10.76
Tiffin.....	10,501	7,879	2,622	37.09
Toledo.....	81,434	50,137	31,297	62.42
Youngstown.....	33,220	15,435	17,785	115.23
Zanesville.....	21,009	18,113	2,896	15.99

The census returns of several other cities and towns were as follows: Alliance, 7,598; Bellefontaine, 4,238; Bucyrus, 4,951; Cambridge, 4,845; Coshocton, 3,725; Circleville, 6,675; Defiance, 7,681; Fremont, 7,140; Middletown, 7, 673; Norwalk, 7,268; Urbana, 6,499; Warren, 6,086; Wooster, 6,050.

GOVERNORS OF OHIO.—The following is a complete list of the governors of the State, with the periods and dates of services:

TERRITORIAL.

Arthur St. Clair.....1788-1802. Charles H. Byrd.....1802-3.

STATE.

Edward Tiffin.....1803-7	Seabury Ford.....1849-50
Thomas Kirkers.....1807-9	Reuben Hood.....1850-53
Samuel Huntington.....1808-10	William Medill.....1853-56
Return J. Meigs.....1810-14	Salmon P. Chase.....1856-60
Othniel Looker.....1814	William Denison.....1860-62
Thos. Worthington.....1814-18	David Tod.....1862-64
Ethan A. Brown.....1818-22	John Brough.....1864-65
Allen Trimble.....1822	Charles Anderson.....1865-66
Jeremiah Morrow.....1822-25	Jacob Dolson Cox.....1866-68
Allen Trimble.....1826-30	Rutherford B. Hayes.....1868-72
Duncan McArthur.....1830-33	Edward F. Noyes.....1872-74
Robert Lucas.....1832-36	William Allen.....1874-76
Joseph Vance.....1836-38	Rutherford B. Hayes.....1876-77
Wilson Shannon.....1838-40	Thomas L. Young.....1877-78
Thomas Corwin.....1840-42	R. M. Bishop.....1878-80
Wilson Shannon.....1842-44	Charles Foster.....1880-84
Thos. W. Bartley.....1844	George Hoadley.....1884-86
Mordecai Bartley.....1844-46	Jos. B. Foraker.....1886-90
William Bebb.....1846-49	James E. Campbell.....1890-92

The governor's official term closes Jan. 4, 1892. The governor's salary is \$8,000.

AREAS AND POPULATION BY COUNTIES.—The land areas in square miles, and the population, severally, of the counties of the State were as follows in 1890:

Counties.	Area.	Population.	
		1890.	1880.
Adams.....	488	26,093	24,006
Allen.....	447	40,644	31,314
Ashland.....	437	23,223	23,583
Ashtabula.....	700	43,655	37,139
Athens.....	465	35,194	28,411
Auglaize.....	398	28,100	25,444
Belmont.....	520	57,413	49,638
Brown.....	460	29,899	32,911
Butler.....	475	43,579	42,579
Carroll.....	401	17,566	16,416
Champaign.....	447	26,980	27,817
Clark.....	393	51,277	41,948
Clermont.....	496	39,553	36,713
Clinton.....	384	24,240	24,756
Columbiana.....	558	59,029	48,602
Coshocton.....	550	26,703	26,542
Crawford.....	393	31,927	30,583
Cuyahoga.....	480	309,970	196,943
Darke.....	600	42,961	40,496
Defiance.....	414	25,769	22,515
Delaware.....	452	27,189	27,381
Erie.....	260	35,462	32,640
Fairfield.....	474	39,939	34,284
Fayette.....	598	22,306	20,364
Franklin.....	524	124,087	86,797
Fulton.....	402	22,023	21,053
Gallia.....	441	27,005	27,124
Geauga.....	400	13,489	14,251
Greene.....	416	29,820	31,949
Guernsey.....	517	28,645	27,197
Hamilton.....	400	374,573	313,374
Hancock.....	522	42,568	37,784
Hardin.....	425	28,939	27,023
Harrison.....	405	20,830	20,466
Henry.....	420	25,090	20,586
Highland.....	527	29,048	30,281
Hocking.....	408	22,658	21,126
Holmes.....	436	21,159	20,776
Huron.....	480	31,949	31,009
Jackson.....	392	28,408	23,696
Jefferson.....	435	39,115	33,018
Knox.....	527	27,000	27,431
Lake.....	240	18,245	16,326
Lawrence.....	430	39,556	39,068
Licking.....	685	43,279	40,459
Logan.....	488	27,386	26,267
Lorain.....	530	40,295	35,526
Lucas.....	430	102,296	67,377
Madison.....	465	20,067	20,129
Mahoning.....	422	55,979	42,871
Marion.....	416	24,727	20,566
Medina.....	420	21,742	21,453
Meigs.....	415	29,813	32,336
Mercer.....	460	27,220	21,806
Miami.....	396	39,764	36,156
Monroe.....	468	25,175	26,496
Montgomery.....	480	100,852	78,550
Morgan.....	400	19,143	20,074
Morrow.....	432	18,120	19,072
Muskingum.....	651	51,210	49,774
Noble.....	415	20,753	21,138
Ottawa.....	311	21,974	19,762
Paulding.....	414	25,932	13,485
Perry.....	402	31,151	28,218
Pickaway.....	501	26,969	27,415
Pike.....	436	17,482	17,927
Portage.....	480	27,868	27,500
Preble.....	432	23,421	24,533
Putnam.....	480	30,188	23,713
Richland.....	487	38,072	36,306

Counties.	Area.	Populations.	
		1890.	1850.
Ross	658	39,454	40,307
Sandusky	418	30,617	32,057
Scioto	613	35,377	33,511
Seneca	344	40,869	36,947
Shelby	430	24,707	24,137
Stark	560	34,170	64,031
Summit	391	54,089	43,788
Trumbull	625	42,373	44,880
Tuscarawas	539	46,618	40,198
Union	427	22,560	22,375
Van Wert	405	28,671	23,028
Vinton	402	16,045	17,323
Warren	428	25,468	28,392
Washington	635	43,380	43,244
Wayne	540	39,005	40,076
Williams	416	24,837	23,321
Wood	628	44,392	34,022
Wyandot	404	21,732	22,395

CONDENSED HISTORIC OUTLINE.—Ohio was explored by the French in 1673; ceded to the British in 1763, and to the United States in 1783; settled by New Englanders in 1783; admitted into the Union in 1802; and received its present limits in 1836.

PROGRESS OF POPULATION IN OHIO BY DECADES.—In 1800, 45,365; 1810, 230,760; 1820, 581,295; 1830, 937,903; 1840, 1,519,467; 1850, 1,980,428; 1860, 2,339,511; 1870, 3,665,260; 1880, 3,198,062; 1890, 3,672,316.

OHNET, GEORGES, a French novelist of great popularity, born April 3, 1848, at Paris. He studied law, and after practicing some time as an advocate took to journalism, and later to literature proper. Under the general title of *Les Batailles de la Vie* he has published a series of novels dealing comprehensively with social questions. The first in this cycle of romances was *Serge Panine* quickly followed by *Le Maître de Forges*; *La Comtesse Sarah*; *Lise Fleuron*; *La grande Marnière*; *Les Dames de la Croix-Mort*; and *Volonté*.

OIL-BEETLE, a name given to beetles of the *Meloe* and allied genera, which when disturbed emit a yellowish oily liquor from the joints of their legs. Some species are used as vesicants instead of cantharides.

OIL CITY, a city of Pennsylvania, at the mouth of Oil Creek, on the Allegheny River. It is an important railroad center and shipping-point for oil, and contains numerous manufactures connected with the trade of the oil regions. Population in 1890, 10,943.

OIL. See OILS, Britannica, Vol. XVII., pp. 739-749. Also PETROLEUM, Vol. XVIII., pp. 712-720. Of the distinctive American oils we mention lard oil, menhaden oil, porpoise oil, sperm and whale oils, castor oil, corn oil, and linseed and cottonseed oils.

ANIMAL AND FISH OILS.—*Lard Oil* is used for burning where absolute safety is demanded. It is largely employed in compounding lubricating oils. Chicago is the center of the lard oil industry.

Menhaden Oil was ten years ago produced to the amount of three and one-half millions of gallons annually, but now only two millions are produced. It is chiefly used by tanners and in the safety lamps of miners. It is made from a fish, the menhaden, called in New England the "mossbunker,"

which appears in large shoals along the Atlantic coast from Maine to Delaware.

Porpoise Oil is made at New Bedford, Mass. It is used in small quantities for lubricating fine machinery.

Sperm and Whale Oils. In 1860, 73,700 barrels of sperm oil and 140,000 barrels of whale oil were produced in the United States. Since that year the whale fishery has steadily declined. In 1887 the amount of sperm oil produced was only 18,873 barrels, and of whale oil 34,171 barrels. New Bedford, Mass., is still the most important whaling point. San Francisco ranks second.

VEGETABLE OILS.—*Castor Oil* is nearly all made by five manufacturing firms which control its price. Only the best quality is in demand for medical purposes. It is used as a purgative.

Corn or Maize Oil. In the manufacture of starch from corn the germs of the grains are collected, then steamed, and pressed out by means of hydraulic presses. The oil thus pressed out is pale yellowish brown, and its odor is that of freshly ground corn-meal. It does not readily become rancid, and saponifies rapidly with caustic alkalies, forming a white soap. For fine toilet-soaps it is found to equal the best olive oil. Its price is about the same as the current market price for cottonseed oil.

Cottonseed Oil.—See COTTONSEED AND COTTONSEED OIL in these Revisions and Additions.

Linseed or Flaxseed Oil.—For the mixing of paint and the manufacture of varnishes and oil-cloths (linoleum, Lincrusta, Walton, etc.), linseed oil remains still the most satisfactory material. There are about 65 oil mills in the United States, about 50 of these being in the Western States, with a capacity of 40,000,000 of gallons per year. Chicago is the center of the linseed oil market.

ESSENTIAL OILS.—Of the essential oils, the United States produce chiefly *peppermint oil* in New York and Michigan; *sassafras oil* in Maryland, Virginia, Delaware, and West Virginia; and *wintergreen oil* in New Jersey, New York, and Pennsylvania. The latter is not made from the plant called wintergreen, but is distilled out of the bark of the sweet birch, which is richer in oil than the wintergreen, from which it was formerly made. The properties of the oil from both sources are identical.

OINTMENTS, fatty substances intended to be applied to the skin by rubbing in, and having the consistence of butter. The material employed as a basis for the ointment varies considerably, and as a rule the activity and action are entirely due to the substance incorporated with the basis. The most generally used basis is lard, either alone or mixed with wax, to give it more consistence. To avoid rancidity, the lard is usually melted previously with gum benzoin, and is then known as *benzoated lard*. Although lard is readily absorbed by the skin, yet in this respect it is surpassed by sheep's wool fat and oleic acid. The former of these, when incorporated with water, forms an excellent ointment base, smooth, and in every way suitable. So also some of the unctuous oleates are used with great advantage. Soft paraffin has also been used for ointments, and does not turn rancid. As nearly all substances may be made into ointments, there is no limit to their number, but perhaps the best known are zinc ointment, boracic ointment, and the red and white precipitate ointments. In all cases the greatest care is required to insure that the active principle is rubbed perfectly smooth with a small quantity of oil or lard before adding the bulk of the ingredients, otherwise the production of a homogeneous ointment free from grit is impossible.

OJIBBEWAYS, or CHIPPEWAYS. See **CHIPPEWAY INDIANS and INDIANS, NORTH AMERICAN**, in these **Reviews and Additions.**

OKLAHOMA TERRITORY, a new territory of the United States, organized under the provision of an Act of Congress, approved May 2, 1890. To furnish the reader with the earliest and fullest information with regard to the boundaries, constitution, government, judiciary, and executive administration of the new territory which promises to occupy an important relation to the other members of the great family of the States, the full text of the Congressional Act is here inserted:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, Sec. 1. That all that portion of the United States now known as the Indian Territory, except so much of the same as is actually occupied by the five civilized tribes, and the Indian tribes within the Quapaw Indian Agency, and except the unoccupied part of the Cherokee outlet, together with that portion of the United States known as the Public Land Strip, is hereby erected into a temporary government by the name of the Territory of Oklahoma. The portion of the Indian Territory included in said Territory of Oklahoma is bounded by a line drawn as follows: Commencing at a point where the ninety-eighth meridian crosses the Red River, thence by said meridian to the point where it crosses the Canadian River, thence down said line to the west line of the Seminole country, thence along said line to the north fork of the Canadian River, thence down said river to the west line of the Creek country, thence along said line to the northwest corner of the Creek country, thence along the north line of the Creek country to the ninety-sixth meridian, thence northward by said meridian to the southern boundary line of Kansas, thence west along said line to the Arkansas River, thence down said river to the north line of the land occupied by the Ponca tribe of Indians from which point the line runs so as to include all the lands occupied by the Ponca, Tonkawa, Otoe and Missouri, and the Pawnee tribes of Indians until it follows the south line of the Cherokee outlet which it follows westward to the east line of the State of Texas, thence by the boundary line of the State of Texas to the point of beginning; the Public Land Strip, which is included in the Territory of Oklahoma, is bounded east by the one-hundredth meridian, south by Texas, west by Mexico, north by Colorado, and Kansas. Whenever the interest of the Cherokee Indians in the land known as the Cherokee outlet shall have been extinguished and the President shall make proclamation thereof, said outlet shall, thereupon and without further legislation, become a part of the Territory of Oklahoma. Any other lands within the Indian Territory not embraced within these boundaries shall hereafter become a part of the Territory of Oklahoma whenever the Indian nation or tribe owning such lands shall signify to the President of the United States in legal manner its assent that such lands shall so become a part of said Territory of Oklahoma, and the President shall thereupon make proclamation to that effect.

Congress may at any time hereafter change the boundaries of said Territory, or attach any portion of the same to any other State or Territory of the United States without the consent of the inhabitants of the Territory hereby created: *Provided*, That nothing in this act shall be construed to impair any right now pertaining to any Indians or Indian tribe in said Territory under the laws, agreements, and treaties of the United States, or to impair the rights of person or property pertaining to said Indians, or to affect the authority of the Government of the United States to make any regulation or to make any law respecting said Indians, their lands, property or other rights which it would have been competent to make had this act not been passed.

EXECUTIVE AUTHORITY. Sec. 2. That the executive power of the Territory of Oklahoma shall be vested in a governor, who shall hold his office for four years, and until his successor shall be appointed and qualified, unless sooner removed by the President of the United States. The governor shall reside within the Territory; he shall be commander-in-chief of the militia thereof; he may grant pardons and reprieves against the laws of said Territory, and reprieves for offenses against the laws of the United States, until the decision of the President can be made known thereon; he shall commission all officers who shall be appointed to office under the laws of said Territory, and shall take care that the laws be faithfully executed.

Sec. 3. That there shall be a secretary of said Territory, who shall reside therein and hold his office for four years unless sooner removed by the President of the United States; he shall record and preserve all the laws and the proceedings of the legislative assembly hereinafter constituted, and all acts and proceedings of the governor and the executive department; he shall transmit one copy of the laws and journals of the legislative assembly, within thirty days after the end of each session thereof, to the President of the United States and to the Secretary of the Interior and, at the same time, two copies of the laws and journals of the legislative assembly to the Speaker of the House of Representatives and

the President of the Senate for the use of Congress; and in case of the death, removal, resignation, or other necessary absence of the governor from the Territory, the secretary shall execute all the powers and perform all the duties of governor during such vacancy or absence, or until another governor is appointed and qualified.

LEGISLATIVE AUTHORITY. Sec. 4. That the legislative power and authority of said Territory shall be vested in the governor and legislative assembly. The legislative assembly shall consist of a council and house of representatives. The council shall consist of thirteen members, having the qualifications of voters as hereinafter prescribed, whose term of service shall continue two years. The house of representatives shall consist of twenty-five members, possessing the same qualifications as prescribed for members of the council, and whose term of service shall continue two years, and sessions of the legislative assembly shall be biennial and shall be limited to sixty days' duration: *Provided*, however, That the duration of the first session of said legislative assembly shall continue one hundred and twenty days.

PROVISIONAL DISTRICTS. That for the purpose of facilitating the organization of a temporary government in the Territory of Oklahoma, seven counties are hereby established therein, to be known, until after the first election in the Territory, as the First County, the Second County, the Third County, the Fourth County, the Fifth County, and the Sixth County, the names of which shall be selected by the governor of the Territory until otherwise provided by the legislative assembly thereof. The county seat of the First County shall be at Guthrie. The county seat of the Second County shall be at Oklahoma City. The county seat of the Third County shall be at Norman. The county seat of the Fourth County shall be at El Reno. The county seat of the Fifth County shall be at Kingfisher City. The county seat of the Sixth County shall be at Stillwater. The Seventh County shall embrace all that portion of the Territory lying west of the one hundredth meridian, known as the Public Land Strip, the county seat of which shall be at Beaver: *Provided*, That the county seats located by this act may be changed in such a manner as the Territorial legislative assembly may determine.

FIRST ELECTION. At the first election for members of the legislative assembly the people of each county may vote for a name for such county, and the name which receives the greatest number of votes shall be the name of such county. If two or more counties should select the same name, the county which cast the greatest number of votes for such name shall be entitled to the same, and the names receiving the next highest number of votes in other counties shall be the names of such counties. An apportionment shall be made by the governor as nearly equal as practicable among the several counties or districts for the election of the council and house of representatives, giving to each section of the Territory representation in the ratio of its population (except Indians not taxed) as nearly as may be, and the members of the council and house of representatives shall reside in and be inhabitants of the district for which they may be elected, respectively.

Previous to the first election the governor shall cause a census or enumeration of the inhabitants of the several counties or districts of the Territory to be taken, unless the same has been taken and published by the United States, in which case such census and enumeration shall be adopted, and the first election shall be held at such times and places and be conducted in such manner, both as to the persons who shall conduct and receive the returns thereof, as the governor shall appoint and direct, and he shall at the same time declare the number of the members of the council and house of representatives to which each of the counties or districts shall be entitled, as shown by the census herein provided for. The number of persons authorized to be elected, having the highest number of legal votes in each of said counties or districts for members of the council, as declared by the governor to be duly elected to the council, and the person or persons authorized to be elected, having the greatest number of votes for the house of representatives equal to the number to which each county or district shall be entitled, shall be declared by the governor to be elected members of the house of representatives of the Territory. In case two or more persons voted for have an equal number of votes, and in case a vacancy otherwise occurs in either branch of the legislative assembly, the governor shall order a new election, and the persons thus elected to the legislative assembly shall meet at such place and on such day as the governor shall appoint and direct for the first election, however, the time, place and manner of holding elections by the people, and the apportionment of representation, and the day of the commencement of the regular session of the legislative assembly shall be prescribed by law: *Provided*, however, That the governor shall have power to call the legislative assembly together by proclamation, on an extraordinary occasion at any time.

QUALIFICATIONS OF VOTERS. Sec. 5. That all male citizens of the United States above the age of twenty-one years, and all male persons of foreign birth over said age who shall have twelve months prior thereto declared their intention to become citizens of the United States, and as required by law, who are actually residing at the time of the passage of this act of that portion of said Territory which was declared by the proclamation of the President to be open for settlement on the twenty-second day of April, anno Domini eighteen hundred and eighty-nine, and of that portion of said Territory heretofore known as the Public Land Strip, shall be entitled to vote

at the first election in the Territory. At every subsequent election the qualifications of voters and of holding office shall be such as may be prescribed by the legislative assembly, subject, however, to the following restrictions on the power of the legislative assembly, namely: First. The right of suffrage and of holding office shall be exercised only by citizens of the United States above the age of twenty-one years and by persons of foreign birth above that age who have declared, on oath, before a competent court of record, as required by the naturalization laws of the United States their intention to become citizens, and have taken an oath to support the Constitution of the United States, and who shall have been residents of the United States for the term of twelve months before the election at which they offer to vote. Second. There shall be no denial of the elective franchise or of holding office to a citizen on account of race, color, or previous condition of servitude. Third. No officer, soldier, seaman, marine, or other person in the army or navy, or attached to troops in said Territory of the United States, shall be allowed to vote in said Territory on account of being on services therein. Fourth. No person belonging to the army or navy shall be elected to, or hold, any civil office or appointment in said Territory.

SCOPE OF LEGISLATION. Sec. 6. That the legislative power of the Territory shall extend to all rightful subjects of legislation not inconsistent with the constitution and laws of the United States, but no law shall be passed interfering with the primary disposal of the soil; no tax shall be imposed upon the property of the United States, nor shall the lands or other property of non-residents be taxed higher than the lands or other property of residents, nor shall any law be passed impairing the right to private property, nor shall any unequal discrimination be made in taxing different kinds of property, but all property subject to the taxation shall be taxed in proportion to its value. That nothing herein shall be held to prohibit the levying and collecting licenses or special taxes in the Territory from persons engaged in any business therein, if the legislative power shall consider such taxes necessary. Every bill which shall have passed the council and the house of representatives of said Territory shall, before it becomes a law, be presented to the governor of the Territory. If he approve he shall sign it, but if not, he shall return it with his objections to the house in which it originated, who shall enter the objections at large upon their journal and proceed to reconsider it. If after such reconsideration, two-thirds of that house shall agree to pass the bill, it shall be sent, together with the objections, and if approved by two-thirds of that house it shall become a law. But in all such cases the vote of both houses shall be by yeas and nays to be entered on the journal of each house, respectively. If any bill shall not be returned by the governor within five days (Sunday excepted) after it shall have been presented to him, the same shall be a law in like manner as if he had signed it, unless the assembly, by adjournment, prevent its return, in which case it shall not be a law.

TOWNSHIP AND DISTRICT OFFICERS. Sec. 7. That all township, district and county officers, not herein otherwise provided for, shall be appointed or elected, as the case may be, in such manner as shall be provided by the governor and legislative assembly of the Territory. The governor shall nominate and, by and with the advice and consent of the council, appoint all officers not otherwise provided for, and in the first instance the governor may appoint all such officers, who shall hold their offices until the end of the first session of the legislative assembly; and he shall lay off the necessary districts for members of the council and house of representatives, and all other officers, and whenever a vacancy happens from resignation or death, during the recess of the legislative council in any office which is filled by appointment of the governor and with the advice and consent of the council, the governor shall fill such vacancy by granting a commission, which shall expire at the end of the next session of the legislative council. It is further provided that the legislative assembly shall not authorize the issuing of bond, receipt or evidence of debt by the Territory, or any county, city, town or township therein for the construction of any railroad.

RESTRICTION OF OFFICE-HOLDERS. Sec. 8. That no member of the legislative assembly shall hold or be appointed to any office which has been created or the salary or emoluments of which have been increased while he was a member, during the term for which he was elected and for one year after the expiration of such term, but this restriction shall not be applicable to members of the first legislative assembly provided for by this act; and no person holding a commission or appointment under the United States, except postmasters, shall be a member of the legislative assembly, or shall hold any office under the government of said Territory.

COURTS AND JUDICIAL ADMINISTRATION. Sec. 9. That the judicial power of said Territory shall be vested in a supreme court, district courts, probate courts and justices of the peace. The supreme court shall consist of a chief-justice and two associate justices, any two of whom shall constitute a quorum. They shall hold their offices for four years, and until their successors are appointed and qualified, and they shall hold a term annually at the seat of government of said Territory. The jurisdiction of the several courts herein provided for, both appellate and original, and that of the pro-

bate courts and of the justices of the peace, shall be as limited by law. *Provided,* That justices of the peace, who shall be elected in such manner as the legislative assembly may provide by law, shall not have jurisdiction of any matter in controversy when the title or boundaries of land may be in dispute, or where the debt or sum claimed shall exceed one hundred dollars; and the said supreme and district courts, respectively, shall possess chancery as well as common law jurisdiction, and authority for redress of all wrongs committed against the person or property. Said Territory or of the Territory affecting persons or property. Said Territory shall be divided into three judicial districts, and a district court shall be held in each county in said district thereof by one of the justices of the supreme court, at such time and place as may be prescribed by law, and each judge after assignment shall reside in the district to which he is assigned. The supreme court shall define said judicial districts, and shall fix the times and places at each county seat in each district where the district court shall be held and designate the judge who shall preside therein. And the territory not embraced in organized counties shall be attached for judicial purposes to such organized county or counties as said Territory shall appoint its own clerk, who shall hold his office at the pleasure of the court for which he is appointed. Each district court shall appoint its own clerk, who shall also be the register in chancery, and shall keep his office where the court may be held. Writs of error, bills of exception and appeals shall be allowed in all cases from the final decisions of said district courts to the supreme court under such regulations as may be prescribed by law, but in no case removed to the supreme court shall trial by jury be allowed in said court. Writs of error and appeals from the final decisions of said supreme court shall be allowed and made according to the Supreme Court of the United States in the same manner and under the same regulations as from the circuit courts of the United States, where the value of the property or the amount in controversy, to be ascertained by oath or affirmation of either party or competent witness, shall exceed five hundred dollars; and each of the said district courts shall have and exercise, exclusive of any court heretofore established, the same jurisdiction in all cases arising under the constitution and laws of the United States as is vested in the circuit and district courts of the United States. In addition to the jurisdiction otherwise conferred by this act, said district courts shall have and exercise exclusive original jurisdiction over all offenses against the laws of the United States committed within that portion of the Cherokee Outlet not embraced within the boundaries of said Territory of Oklahoma as herein defined, and in all civil cases between citizens of the United States residing in such portion of the Cherokee Outlet, or between citizens of the United States, or of any State or Territory, and any citizen of or person or persons residing or found therein, when the value of the thing in controversy or damages or money claimed shall exceed one hundred dollars; writs of error, bills of exception and appeals shall in all cases, civil and criminal, be allowed from the district courts to the supreme court in like manner, and be proceeded with in like manner as in cases arising within the limits of said Territory. For all judicial purposes as herein defined, that portion of the Cherokee Outlet not embraced within the boundaries of the Territory of Oklahoma shall be attached to, and be a part of, one of the judicial districts of said Territory as may be designated by the Supreme Court. All acts and parts of acts heretofore enacted, conferring jurisdiction upon United States courts held beyond and outside the limits of the Territory of Oklahoma as herein defined, as to all causes of action or offenses in said Territory, and in that portion of the Cherokee Outlet hereinbefore referred to, are hereby repealed, and such jurisdiction is hereby given to the supreme and district courts in said Territory; but all actions commenced in such courts, and crimes committed in said Territory and in the Cherokee Outlet, prior to the passage of this act, shall be tried and prosecuted, now having jurisdiction thereof as if this act had not been passed. The said supreme and district courts shall grant writs of mandamus and habeas corpus in all cases authorized by law; and the first six days of every term of said courts, or so much thereof as shall be necessary, shall be appropriated to the trial of causes arising under the said constitution and laws; and writs of error and appeals in all such cases shall be made to the supreme court of said Territory, as in other cases.

Sec. 10. Persons charged with any offense or crime in the Territory of Oklahoma, and for whose arrest a warrant has been issued, may be arrested by the United States marshal or any of his deputies, wherever found in said Territory, but in all cases the arrest shall be taken, for preliminary examination, before a United States commissioner, or a justice of the peace of the county, whose office is nearest to the place where the offense or crime was committed.

All offenses committed in said Territory, if committed within any organized county, shall be prosecuted and tried within said county, and if committed within territory not embraced in any organized county, shall be prosecuted and tried in the county in which such territory shall be attached for judicial purposes. And all civil actions shall be instituted in the county in which the defendant, or either of them, resides or may be found; and when such actions arise

within any portion of said Territory, not organized as a county, such actions shall be instituted in the county to which such territory is attached for judicial purposes; but any case, civil or criminal, may be removed, by change of venue, to another county.

APPLICATION OF LAWS.—Sec. 11. That the following chapters and provisions of the laws of the State of Nebraska, in force November first, eighteen hundred and eighty-nine, in so far as they are locally applicable, and not in conflict with the laws of the United States or with this act, are hereby extended to and put in force in the Territory of Oklahoma until after the adjournment of the first session of the legislative assembly of said Territory, to-wit: the provisions of articles two, three and four of chapter two, entitled "Agriculture"; of chapter four, entitled "Animals"; of chapter six, entitled "Assignments"; of chapter seven, entitled "Attorneys"; of chapter ten, entitled "Bonds and oaths—official"; of chapter twelve, entitled "Chattel mortgages"; of chapter fourteen, entitled "Cities of the second class and villages"; of chapter fifteen, entitled "Common law"; of chapter sixteen, entitled "Corporations"; of chapter eighteen, entitled "County and county officers"; of sections fifteen and sixteen of article six of the constitution of said State, and of chapter twenty of said laws, entitled "Courts—probate"; of chapter twenty-three, entitled "Deputies"; of chapter twenty-four, entitled "Deputies"; of chapter twenty-five, entitled "Divorce and alimony"; of chapter twenty-six, entitled "Elections"; of chapter twenty-eight, entitled "Fees"; of chapter thirty-two, entitled "Frauds"; of chapter thirty-four, entitled "Guardians and wards"; of chapter thirty-six, entitled "Homes—seeds"; of chapter forty-one, entitled "Instruments negotiable"; of chapter forty-four, entitled "Interests"; of chapter forty-six, entitled "Jails"; of chapter fifty, entitled "Liquors"; but no licenses shall be issued under this chapter; of chapter fifty-two, entitled "Marriage"; of chapter fifty-three, entitled "Married women"; of chapter fifty-four, entitled "Mechanics and laborers' liens"; of chapter sixty-one, entitled "Notaries public"; of chapter sixty-two, entitled "Oaths and affirmations"; of chapter sixty-three, entitled "Occupying claimants"; of article one of chapter seventy-two, entitled "Railroads"; of chapter seventy-three, entitled "Real estate"; and the provisions of part two of said laws, entitled "Code of civil procedure," and of part three thereof, entitled "Criminal code."

PROVISION FOR EDUCATION.—The governor of said Territory is authorized to divide each county into election precincts and into such political sub-divisions other than school districts as may be required by the laws of the State of Nebraska; and he is hereby authorized to appoint all officers of such counties and divisions, and to remove them when necessary, and all election officers until their election or appointment shall be provided for by the legislative assembly, but not more than two of the judges or inspectors of election in any election precinct shall be members of the same political party, and the candidates of each political party who may be elected to such election shall designate one person who shall be present at the counting and canvassing of the votes cast in each precinct.

SUPREME COURT SUPERVISION.—The supreme and district courts of said Territory shall have the same power to enforce the laws of the State of Nebraska hereby extended to and put in force in said Territory as courts of like jurisdiction have in said State; but county courts of justice of the peace shall have and exercise the jurisdiction which is authorized by said laws of Nebraska: *Provided*, That the jurisdiction of justices of the peace in said Territory shall not exceed the sum of \$100, and county courts shall have jurisdiction in all cases where the sum or matter in demand exceeds the sum of \$100.

Sec. 12. That jurisdiction is hereby conferred upon the district courts in the Territory of Oklahoma over all controversies arising between members or citizens of one tribe or nation of Indians and the members or citizens of other tribes or nations in the Territory of Oklahoma, and any citizen or member of one tribe or nation who may commit any offense or crime in said Territory against the person or property of a citizen or member of another tribe or nation shall be subject to the same punishment in the Territory of Oklahoma as he would be if both parties were citizens of the United States; and any person residing in the Territory of Oklahoma, in violation of the laws of the United States, shall be subject to the aid of courts therein for the protection of his person or property, as though he were a citizen of the United States: *Provided*, That nothing in this act contained shall be so construed as to give jurisdiction to the courts established in said Territory in controversies arising between Indians of the same tribe, while maintaining their tribal relations.

Sec. 13. That there shall be appointed for said Territory a person learned in the law, who shall act as attorney for the United States, and shall continue in office for four years, and until his successor is appointed and qualified, unless sooner removed by the President. Said attorney shall receive a salary at the rate of \$350 annually. There shall be appointed a marshal for said Territory, who shall hold his office for four years, and until his successor is appointed and qualified, unless sooner removed by the President, and who shall execute all process issuing from the said courts when exercising their jurisdiction as circuit and district courts of the United States; he shall have the power and perform the duties and in such cases the same regulations and penalties imposed by law on the marshal of the United States, and be

entitled to a salary at the rate of \$200 a year. There shall be allowed to the attorney, marshal, clerks of the supreme and district courts the same fees as are prescribed for similar services by such persons in chapter sixteen, title Judiciary, of the Revised Statutes of the United States.

APPOINTMENT OF EXECUTIVE OFFICERS.—Sec. 14. That the governor, secretary, chief justice and associate justice, attorney and marshal shall be nominated and, by and with the advice and consent of the Senate, appointed by the President of the United States. The governor and secretary to be appointed as aforesaid shall, before they act as such, respectively take an oath or affirmation before the district judge, or some justice of the peace, or the district officer in the limits of said Territory duly authorized to administer oaths and affirmations by the laws now in force therein, or before the Chief Justice or some associate justice of the Supreme Court of the United States, to support the Constitution of the United States and faithfully to discharge the duties of their respective offices, which said oaths, when so taken, shall be certified by the person by whom the same shall have been taken; and such certificates shall be received and recorded by the secretary among the executive proceedings, and the chief justice and associate justices, and all other civil officers in said Territory, before they act as such, shall take a like oath or affirmation before the said governor or secretary, or some judge or justice of the peace of the Territory, who may be duly commissioned and qualified, which said oath or affirmation shall be certified and transmitted by the person taking the same to the secretary, to be recorded by him as aforesaid, and afterwards the like oath or affirmation shall be taken, certified and recorded in such manner and form as may be prescribed by law. The governor shall receive an annual salary of \$2,500 as governor; the chief justice and associate justices shall receive an annual salary of \$3,000, and the secretary shall receive an annual salary of \$1,800. The said salaries shall be payable quarterly-yearly at the Treasury of the United States. The members of the legislative assembly shall be entitled to receive \$4 for each day of their attendance at the sessions, and \$4 for each and every twenty miles traveled in going to and returning from said sessions, estimating the distance by the nearest traveled route. There shall be appropriated annually the sum of \$1,000, to be expended by the governor to defray the contingent expenses of the Territory. There shall also be appropriated annually a sufficient sum, to be expended by the secretary, and upon an estimate to be made by the Secretary of the Treasury of the United States, to defray the expenses of the legislative assembly, of the courts, the printing of the laws and other incidental expenses; and the secretary of the Territory shall annually account to the Secretary of the Treasury of the United States for the manner in which the aforesaid sum shall have been expended.

LEGISLATIVE SESSIONS.—Sec. 15. That the legislative assembly of the Territory of Oklahoma shall hold its first session at Guthrie, in said Territory, at such time as the governor thereof shall appoint and direct, and at each session, or as soon thereafter as they shall deem expedient, the governor and legislative assembly shall proceed to locate and establish the seat of government for said Territory at such place as they may deem eligible, which place, however, shall thereafter be subject to be changed by the said governor and legislative assembly.

DELEGATE TO CONGRESS.—Sec. 16. That a delegate to the House of Representatives of the United States, to serve during each Congress of the United States, may be elected by the voters qualified to elect members of the legislative assembly, who shall be entitled to the same rights and privileges as are exercised and enjoyed by the Delegates from the several other Territories of the United States in the said House of Representatives. The first election shall be held at such time and place, and be conducted in such manner as the governor shall appoint and direct, after at least sixty days' notice, to be given by proclamation, and at all subsequent elections the time, place and manner of holding the same shall be provided by law. The person having the greatest number of votes of the qualified electors, as hereinbefore provided, shall be declared by the governor elected, and a certificate thereof shall be accordingly given.

NATIONAL BANKS.—Sec. 17. That the provisions of title sixty-two of the Revised Statutes of the United States relating to national banks, and all amendments thereto, shall have the same force and effect in the Territory of Oklahoma as elsewhere in the United States: *Provided*, That persons otherwise qualified to act as directors shall not be required to have resided in said Territory for more than three months immediately preceding their election as such.

PUBLIC SCHOOLS AND RESERVATIONS.—Sec. 18. That sections numbered sixteen and thirty-six in each township in said Territory shall be, and the same are hereby, reserved for the purpose of being applied to public schools in the State or States hereafter to be erected out of the same. In all cases where sections sixteen and thirty-six, or either of them, are occupied by actual settlers prior to survey thereof, the county commissioners of the counties in which such sections are so occupied are authorized to locate other lands, to an equal amount, in sections or fractional sections, as the case may be, in their respective counties, in lieu of the sections so occupied.

HOMESEAD LAND PROVISIONS.—All the lands embraced in that portion of the Territory of Oklahoma heretofore known as the Public Land Strip, shall be open to settlement under

the provisions of the homestead laws of the United States, except section twenty-three hundred and one of the Revised Statutes, which shall not apply; but all actual and bona fide settlers upon and occupants of the lands in said Public Land Strip at the time of the passage of this act shall be entitled to have preference to and hold the lands upon which they have settled under the homestead laws of the United States, by virtue of their settlement and occupancy of said lands, and they shall be credited with the time they have actually occupied their homesteads, respectively, not exceeding two years, on the time required under said laws to perfect title as homestead settlers.

The lands within said Territory of Oklahoma, acquired by cession of the Muscogee (or Creek) nation of Indians, confirmed by act of Congress approved March 3, 1889, and also the lands acquired in pursuance of an agreement with the Seminole nation of Indians, by re-lease and conveyance, dated March 16, 1889, which may hereafter be open to settlement, shall be disposed of under the provisions of sections twelve, thirteen and fourteen of the "Act making appropriations for the current and contingent expenses of the Indian department, and for fulfilling treaty stipulations with various Indian tribes, for the year ending June 30, 1890, and for other purposes," approved March 2, 1889, and under section 8 of the "Act to ratify and confirm an agreement with the Muscogee (or Creek) nation of Indians in the Indian Territory, and for other purposes," approved March 1, 1889: *Provided, however*, That each settler, under and in accordance with the provisions of said acts shall be entitled to receive a patent for his homestead on the land hereafter opened to settlement as aforesaid, pay to the United States for the land so taken by him, in addition to the fees provided by law, the sum of one dollar and twenty-five cents per acre.

Whenever any of the other lands within the Territory of Oklahoma, now occupied by any Indian tribe, shall by operation of law or proclamation of the President of the United States, be open to settlement, they shall be disposed of to actual settlers only, under the provisions of the homestead laws, except section twenty-three hundred and one of the Revised Statutes of the United States, which shall not apply: *Provided, however*, That each settler, under and in accordance with the provisions of said homestead laws, shall before receiving a patent for his homestead pay to the United States for the land so taken by him, in addition to the fees provided by law, a sum per acre equal to the amount which was borne or may be paid by the United States to obtain a relinquishment of the said title or interest therein, but in no case shall such payment be less than one dollar and twenty-five cents per acre. The rights of honorably discharged soldiers and sailors in the late civil war, as defined and described in sections twenty-three hundred and four and twenty-three hundred and five of the Revised Statutes of the United States, shall not be abridged except as to such payment. All tracts of land in Oklahoma Territory which have been set apart for school purposes, to educational societies, or missionary boards at work among the Indians, shall not be open to settlement, but are hereby granted to the respective educational societies or missionary boards for whose use the same has been set apart. No part of the land embraced within the Territory hereby created shall inure to the use or benefit of any railroad corporation, except the rights of way and land for station purposes heretofore granted to certain railroad corporations. Nor shall any provision of this act or any act of any officer of the United States, done or performed under the provisions of this act or otherwise by any corporation owning or operating any railroad in the Indian Territory, or Territory created by this act, with any land or right to any land in either of said territories, and this act shall not apply to or affect any land which, upon any condition on becoming a part of the public domain, would inure to the benefit of, or become the property of, any railroad corporation.

PUBLIC LAND STRIP. Sec. 19. That portion of the Territory of Oklahoma heretofore known as the Public Land Strip is hereby declared a public land district, and the President of the United States is hereby empowered to locate a land office in said district, at such place as he shall select, and to appoint in conformity with existing law a register and receiver of said land office. He may also, whenever he shall deem it necessary, establish another additional land district within said Territory, locate a land office therein, and in like manner appoint a register and receiver thereof. And the commissioner of the general land office shall, when directed by the President, cause the lands within the Territory to be properly surveyed and subdivided where the same has not already been done.

LAND TITLES. Sec. 20. That the procedure in applications, entries, contests and adjudications, in the Territory of Oklahoma shall be in form and manner prescribed under the homestead laws of the United States, and the general principles and provisions of the homestead laws, except as modified by the provisions of this act and the acts of Congress approved March 1st and 2nd, 1889, heretofore mentioned, shall be applicable to all entries made in said Territory, but no patent shall be issued to any person who is not a citizen of the United States at the time of making final proof.

All persons who shall settle on land in said Territory, under the provisions of the homestead laws of the United States, and of this act, shall be required to select the same in square form as nearly as may be; and no person who shall at the time be seized in fee simple of a hundred and sixty acres of

land in any State or Territory, shall hereafter be entitled to enter land in said Territory of Oklahoma. The provisions of sections 2344 and 2345 of the Revised Statutes of the United States shall, except so far as modified by this act, apply to all homestead settlements in said Territory.

Sec. 21. That any person, entitled by law to take a homestead in said Territory of Oklahoma, who, by reason of fraud and filed upon, or shall hereafter locate and file upon, a homestead within the limits described in the President's proclamation of April 1st, 1889, and under and in pursuance of the laws applicable to the settlement of the lands opened for settlement by such proclamation, and who has complied with all the laws relating to such homestead settlement, may receive a patent therefor at the expiration of twelve months from date of locating upon said homestead, upon payment to the United States of one dollar and twenty-five cents per acre for lands embraced in such homestead.

LAND SITES. Sec. 22. That the provisions of title 32, chapter 8 of the Revised Statutes of the United States, relating to "reservation and sale of town sites on the public lands," shall apply to the lands open, or to be opened to settlement, in the Territory of Oklahoma, except those opened to settlement by the proclamation of the President on the 22nd day of April, 1889. *Provided*, That hereafter all surveys for town sites in said Territory shall contain reservations for parks (of substantial or other public purposes, embracing not less than one park) and for schools and other public purposes, embracing not less than ten nor more than twenty acres, and patents for such reservations, to be maintained for such purposes, shall be paid to the towns respectively when organized, and for such purposes: *Provided further*, That in case any lands in said Territory of Oklahoma, which may be occupied and filed upon as a homestead, by a person who is entitled to perfect his title thereto under such laws, are required to be opened to settlement, it shall be lawful for such person to apply to the Secretary of the Interior to purchase the lands embraced in said homestead or any part thereof for town-site purposes. If such and if such the application a plat of such proposed town site, Interior, he shall be approved by the Secretary of the Interior, he shall inure to such person for land embraced in said town site, upon the payment of the sum of \$10 per acre for all the lands embraced in such town site, except the lands to be donated and maintained for public purposes, as provided in this section. And the sums so received by the Secretary of the Interior shall be paid over to the proper authorities of the municipalities when organized, to be used by them for school purposes only.

Sec. 23. That there shall be reserved public highways four rods wide between each section of land in said Territory, the section lines being the center of said highways; but no deduction shall be made, where cash payments are provided for, in the amount to be paid for each quarter section of land by reason of such reservation. But if the said highway shall be vacated by any competent authority, the title to the respective strips shall inure to the then owner of the tract of which it formed a part by the original survey.

Sec. 24. That it shall be unlawful for any person, for himself or any company, association, or corporation, to directly or indirectly procure any person to settle upon any lands open to settlement in the Territory of Oklahoma, with intent thereto; and if any person shall do so, he shall be guilty of a misdemeanor, and shall be punished, upon indictment, by imprisonment not exceeding twelve months, or by a fine not exceeding \$1,000, or by both such fine and imprisonment, in the discretion of the court.

LAND IN GREER COUNTY. Sec. 25. That inasmuch as there is a controversy between the United States and the State of Texas as to the ownership of what is known as Greer County, it is hereby expressly provided that this act shall not be construed to apply to said Greer County until the title to the same has been adjudicated and determined to be in the United States; and in order to provide for a speedy and final determination of the controversy aforesaid the Attorney-General of the United States is hereby authorized and directed to commence in the Supreme Court of the United States, and prosecute to a final determination, a proper suit in the State of Texas, setting forth the title and claim of the United States to the tract of land lying between the North and South forks of the Red River where the Indian Territory and the State of Texas adjoin, east of the one hundredth degree of longitude and claimed by the State of Texas as within its boundary and a part of its land, and designated on its map as Greer County, in order that the rightful title to said land may be finally determined, and that the court, on the trial of the case may, in its discretion, so far as the evidence will warrant, consider any evidence heretofore taken and received by the Joint Boundary Commission under the act of Congress approved January thirty-first, eighteen hundred and eighty-five; and said case shall be advanced on the docket of said court, and proceeded with to its conclusion as rapidly as the nature and circumstances of the case permit.

APPROPRIATIONS. Sec. 26. That the following sums of money, if necessary, are hereby appropriated, so much of any money in the Treasury not otherwise appropriated, to be disbursed under the direction of the Secretary of the Interior, in the same manner that similar appropriations are disbursed in the other Territories of the United States, namely:

To pay the expenses of the first legislative assembly of said Territory, including the printing of the session laws thereof, the sum of \$40,000.

To pay the salaries of the governor, the judges of the supreme court, the secretary of the territory, the marshal, the attorney, and other officers whose appointment is provided for in this act, for the remainder of the fiscal year ending June thirtieth, eighteen hundred and ninety, the sum of \$20,000.

To pay for the rent of buildings for the legislative and executive offices, and for the supreme and district courts; to provide jails, and support prisoners; to pay mileage and per diem of jurors and witnesses; to provide books, records, and stationery for the executive and judicial offices for the remainder of the fiscal year ending June thirtieth, eighteen hundred and ninety, the sum of \$15,000.

To enable the governor to take a census of the inhabitants of said Territory, as required by law, the sum of \$5,000.

To be expended by the governor in temporary support and aid of common school education in said Territory, as soon as a system of public schools shall have been established by the legislative assembly, the sum of \$50,000.

CONSTRUCTION OF ACT. Sec. 27. That the provisions of this act shall not be so construed as to invalidate or impair any legal claims or rights of persons occupying any portion of said Territory under the laws of the United States, but such claims shall be adjudicated by the Land Department, or the courts, in accordance with their respective jurisdictions.

Sec. 28. That the Constitution and all the laws of the United States not locally applicable shall, except so far as modified by this act, have the same force and effect as elsewhere within the United States; and all acts and parts of acts in conflict with the provisions of this act are as to their effect in said Territory of Oklahoma hereby repealed: *Provided*, That section eighteen hundred and fifty of the Revised Statutes of the United States shall not apply to the Territory of Oklahoma.

[The remaining sections 31 to 44 of the Congressional act relates to the boundaries and new provisions for the government of the Indian Territory which see.]

AREA AND POPULATION.—The area of Oklahoma is officially reported in the census of 1890 as 39,030 square miles, with a population of 61,834. The following is a list of the eight counties referred to in the above quoted Congressional act, with the figures showing the population severally of said counties:

COUNTIES.	Pop. 1890.
Beaver.....	2,674
Canadian.....	7,158
Cleveland.....	6,605
Kingsfisher.....	8,332
Logan.....	12,770
Oklahoma.....	11,742
Payne.....	7,215
Greer.....	5,338

The names of the county-seats are given above. The population of Guthrie, the State capital, in 1890, was 5,311;* of Oklahoma City 4,138.

BRIEF HISTORIC OUTLINE.—The early history of Oklahoma was merged in that of the Indian Territory, for which, as well as for its topography and productions, see INDIAN TERRITORY, Britannica, Vol. XII, pp. 833-35. The history of Oklahoma proper dates from 1866, when the Indian tribes to whom the lands of that portion of territory had been appropriated by the United States Government, ceded to the Government the western portion of their domain. In the sale of the lands it was stipulated that the lands should be used only for the use of other Indian settlers. Later, however, numerous speculators, under energetic and persistent leaders, claimed that as these lands belonged to the Government they were really open for settlement under the homestead laws, and vigorous efforts were put forth to seize and occupy

them. These pretensions were effectively resisted by the Government until, under Congressional provision, the territory was formally opened to settlers on April 22, 1889. As stated above, the act organizing the new Territory, defining its boundaries and habilitating its government, was passed by the United States Congress. To the area opened for settlement in 1889, was soon added the neighboring tract popularly known as "No Man's Land" (from its political territorial status having been left uncertain by the public surveys), this addition increasing the territory by about 5,700 square miles. During the year of 1891 agreements were made with the Indian tribes living on its eastern border by which a tract about half as large as the original purchase from the Creeks and Seminoles was opened for settlements, in another about 3,000,000 have been acquired by purchase from the Cheyennes and Arapahoes. Smaller areas were later purchased from the Wichitas and Nez Perces, and still later the Cherokees agreed to sell the "Outlet," thus adding about 6,000,000 acres to the northern borders of Oklahoma. The area now virtually open to settlement is about 28,300 square miles, and the population which by census of 1890 was reported at 61,834 is now (January 1892) reported at 80,000. The citizens are now seeking admission as a State.

OKLAHOMA CITY, a city of Oklahoma, on the North Fork of the Canadian River, thirty miles south of Guthrie. It was founded upon the opening of Oklahoma Territory for settlement in April, 1889. Within one month eight hundred houses had been built; and in 1890, according to the United States census report, the resident population was 4,138.

OKOLONA, a village of Mississippi, about seventy miles south of Corinth. It contains a number of prosperous educational institutions and business houses.

OKRA (*Hibiscus esculentus*), a species of the Malvaceae family of plants. It yields long, green pods, with pointed ends. The pods contain numerous kidney-shaped seeds, which are rich in nutritious mucilage, when they are gathered while young. They are used as a thickening material for the peculiar Southern soup called "gumbo." Sometimes the pods are boiled and dressed like asparagus.

OLATHE, a city, the county-seat of Johnson county, Kans., about twenty miles southwest of Kansas City. It is the seat of several educational institutions, the site of an asylum for the deaf and dumb, and the center of a thriving trade. Population in 1890, 3,290.

OLDENBURG, a grand duchy of the German Empire. For general article on OLDENBURG, see Britannica, Vol. XVII, p. 756. Oldenburg embraces an area of 2,508 English square miles. The population in 1885 was reported as follows by divisions: Duchy of Oldenburg, 267,111; principality of Lübeck, 34,721; Principality of Birkenfeld, 39,693. Total 341,525 (males, 169,043; females, 172,477—i.e. 102 per 100 males).

The growth of the population since 1867, when the duchy attained its present limits, is as follows:—1867, 315,995; 1871, 315,728; 1875, 319,314; 1880, 337,478; 1885, 341,525.

In 1885 only 21.5 per cent. of the population lived in towns with 2,000 inhabitants or upwards. Oldenburg, the capital, had 21,423 inhabitants in 1885.

PRESENT REIGNING FAMILY.—Peter I., Grand-duke of Oldenburg, born July 8, 1857; the son of Grand-duke August and of Princess Ida of Anhalt-Bernburg; succeeded to the throne at the death of his father, February 27, 1853; married, Feb. 10, 1852, to Elisabeth, born March 28, 1826, daughter of

* GUTHRIE, a city of Oklahoma, capital of the Territory, situated on the right bank of the Cimarron River, 90 miles south of Arkansas City. It was founded in April, 1889, upon the opening of Oklahoma for settlement. Within one month nearly a thousand houses had been built; and in 1890, according to the United States census report, the resident population numbered 5,311.

Prince Joseph of Saxen-Altenburg. Offspring: 1. Prince August, heir-apparent, born Nov. 16, 1852; married, February 18, 1878, to Princess Elizabeth, born February 8, 1857, second daughter of Prince Friedrich Karl of Prussia; issue a daughter, Sophia, born February 2, 1879. 2. Prince Georg, born June 27, 1855. The Grand-duke has a civil list of 255,000 marks, or 12,750*l*. He draws also a revenue of 8,000*l*. from private estates of the family in Holstein, besides about 7,500*l*. in interest.

FINANCE AND EDUCATION.—The budget estimated the revenue in 1890, at 7,660,310 marks, and the expenditures at 8,177,850 marks.

In 1890 there were 187 school teachers, and 3,155 pupils in the public schools. There were also several higher institutions of learning.

OLD TOWN, a village of Maine, near the Penobscot River, about 12 miles northeast of Bangor. It has a fine water-power and an immense trade in lumber.

OLD POINT COMFORT, a village, the site of Fortress Monroe, and a watering-place of Virginia, at the mouth of James River, on Hampton Roads.

OLDHAMIA, a genus of fossils of unknown affinities met with in the Cambrian system. *Oldhamia* assumes various forms, sometimes consisting of short radiating branches or umbels, which spring at regular intervals from a central thread-like axis; at other times the branches radiate in all directions from a central point. Some paleontologists have supposed the fossil to be a Sertularian zoöphyte; others have referred it to the polyzoa; while yet others think it may be a sea-weed.

OLEAM CHENOCETI, an oil derived from a whale (*Balæna rostrata*) and refined for medicinal purposes. Dr. Gustav Guldberg states that it is an oil whose specific gravity is lower than of any other animal oil, that it flows easily, and that it possesses marked penetrative properties. It follows from this that it is indicated in those cases in which it is desirable rapidly to render the skin fatty, flexible, and extensible. It is also indicated in those cases in which it is desired to promote a rapid absorption of medicaments. The combination of this oil with chloroform is said to surpass every other combination of that anæsthetic with oils. A mixture of equal parts is said to penetrate the skin rapidly and to act upon the nerve terminations very efficiently, thus offering a good application in all forms of pruritus, neuralgia, etc. A good ointment basis may be made by adding one-fourth as much wax. The oil is 40 per cent. cheaper than olive oil, and is superior to many more expensive oils.

OLEAN, a village of New York, on the Alleghany River, at the mouth of Olean Creek, about seventy miles south of Buffalo. It contains a number of educational institutions and is an important center of local trade.

OLEFIANT GAS, or ETHYLENE, the most abundant illuminating constituent in coal-gas. It may be obtained by the destructive distillation of coal, but more readily by the action of sulphuric acid on alcohol. It is a colorless gas with a faint odor, but little soluble in water or alcohol. It may be liquefied by cold and pressure. With air it forms a powerfully explosive mixture, which, on being burned, yields water and carbonic acid gas. When mixed with an equal volume of chlorine, and kept cool and in the dark, the two gases unite, with the production of drops of an oily liquid called Dutch Liquid.

OLEIC ACID, one of the acids present in olive, almond, and other oils, in which it is united to glycerine. At temperatures above 57° it exists as a colorless liquid fluid, of an oily consistence, devoid of smell and taste, and (if it has not been exposed

to air) exerts no action on vegetable colors. At 40° it solidifies into a firm, white, crystalline mass, and in this state it undergoes no change in the air; but when fluid it readily absorbs oxygen, becomes yellow and rancid, and exhibits a strong acid reaction with litmus paper. Oleate of potash forms a soft soap, which is the chief ingredient in Naples soap; while oleate of soda is a hard soap, which enters largely into the composition of Marseilles soap. Of recent years a large number of oleates have come into use in medicine, which depend for their activity on the remarkable ease with which they are absorbed by the skin. Such are the oleates of zinc, mercury, lead, tin, morphia, etc., which, in this form, produce more rapid results than when applied as ointments.

OLENUS, a genus of Cambrian trilobites highly characteristic of the upper members of the system.

OLEOMARGARINE. See Britannica, Vol. XVII, p. 760.

The making of artificial butter from tallow became an important industry soon after the French chemist Mège-Mouriès had shown how to make it. His experiments taught him that by extracting a portion of the stearine and palmitine contained in beef-suet the proportion of oliene in the suet could be brought up to that in butter, and that by proper manipulation he could produce a substance not easily distinguishable from butter, and yet much cheaper. This substance he named oleomargarine. As butter does not contain any margarine, this name was not proper. "Butterine," which is frequently used to designate the artificial article, is a more correct name.

In American factories, which turn out large quantities of oleomargarine, an improved method is now employed. The beef-suet is washed repeatedly in luke-warm water to remove all impurities; then it is minced in a cutting machine and melted by the use of steam, the temperature of the fat being kept between 114° and 122° F. About 5 per cent. of salt is now added. The membranous part sinks to the bottom of the kettles, and the pure fat floats on top and is drawn off. After some purifying processes the fat is allowed to solidify very slowly. Then it is pressed in a hydraulic press, in order to separate the butter-oil from the stearine. This butter-oil is oleomargarine proper. When it ceases to flow, the stearine remains behind as a hard, white, dry mass. The butter-oil is of a light yellow color and an agreeable taste. When cool, it is solid, but it melts in the mouth like butter. When churned it is mixed in the proportion of 442 parts of the oil, 120 parts of fresh milk, 37½ parts of fresh butter, 1¼ oz. of carbonate of soda. This mixture is churned from 5 to 10 minutes, some yellow coloring matter (see ANNATTO) is then added, and after that it is churned from 30 to 40 minutes longer. The substance thus produced resembles butter in taste and appearance, and contains every element that enters into cream butter. It is now very largely manufactured in the United States, partly for home use, but more particularly for shipment to Europe. Three factories in the State of New York produce about 4,500 tons yearly. Other factories are in Kentucky, Pennsylvania, Ohio, Illinois and other States. The value of the production is between 7,000,000 and 8,000,000 of dollars yearly.

Since a great deal of oleomargarine has been passed off as cream butter, Congress has recently enacted a stringent law, by which the sale of this article is taxed and every package of it must be conspicuously marked "oleomargarine." The law lays on the manufacturers a tax of \$600, on wholesale dealers one of \$480, and on retail dealers

one of \$48—with an additional tax of 2 cents on every pound of oleomargarine sold. This law restricted fraudulent sales considerably. Sold for what it is, oleomargarine does not materially interfere with the dairy business, because it is here mostly used for cooking purposes. Its use as table butter is confined to the poorer classes of Europe.

OLEOMETER, an areometer or balance for ascertaining the densities of fixed oils. It consists of a very delicate thermometer-tube, the bulb being large in proportion to the stem, so weighted and graduated as to adapt it to the densities of the leading fixed oils. On the scale is marked the principal oils of commerce, with their specific gravity opposite. The standard temperature of the oleometer is 59° F.

OLIFANT RIVER, a forked stream of Cape Colony, which rises in the mountains northeast of Cape-town, and, after a northwesterly course of 150 miles, enters the Atlantic. Area of drainage basin, 13,000 square miles. Another stream bearing the same name rises in the Transvaal, and goes east to join the Oori.

OLIN, STEPHEN, D. D., born in Leicester, Vt., March 2, 1797, died in Middleton, Conn., Aug. 16, 1851. He graduated at Middlebury in 1820, and after teaching for several years became a Methodist preacher, and was stationed at Charlestown, S. C. In January, 1827, he became professor of belles-lettres in the University of Georgia, and in 1834 president of Randolph Macon College. Three years later he was forced by failing health to leave the college, and spent several years in travel. In 1839 he was elected president of Wesleyan University, but resigned in favor of Rev. Dr. Nathan Bangs, who in 1842 retired in his favor. He published *Travels in Egypt, Arabia Petræa, and the Holy Land*, and a book of travel entitled *Greece and the Golden Horn* was issued posthumously. His collected sermons, sketches, lectures, and addresses were printed in 1853 under the title of *The Works of Stephen Olin*.

OLIPHANT, LAURENCE, traveler, novelist, and mystic, born in 1829, died at Twickenham, Dec. 23, 1888. He was the only son of Sir Anthony Oliphant, chief-justice of Ceylon. In early youth he traveled with Jung Bahadur to Nepal, and after his return was admitted a member of the Scottish bar, and later of the English bar at Lincoln's Inn. His first work, *A Journey to Khatmandu* was followed by *The Russian Shores of the Black Sea*, the fruit of his travels in Russia in 1852. He next became private secretary to the Earl of Elgin, governor-general of Canada, whom later he accompanied on his special embassy to China, thus finding material for his books *Minnesota and the Far West*, and *A Narrative of the Earl of Elgin's Mission to China and Japan in 1857-59*. In 1861, while acting as *Chargé d'Affairs* in Japan, he was severely wounded by assassins, and consequently resigned his post. From 1865 to 1868 he sat in parliament. Having become profoundly influenced by certain peculiar religious opinions, he renounced London society, joined for a time the community of T. L. Harris in the United States, and finally settled at Haifa, in Palestine. The religious opinions of his later years he gave to the world in *Sympneumata and Scientific Religion*, as well as in his novel *Mas-sollam*, while they already formed the background of his earlier novel, *Altiora Peto*. Oliphant, when he subjected his intellect to occultism, brought a bright career to an abrupt conclusion, and flung away a rare literary endowment. His *Piccadilly* was a book of altogether exceptional promise, bright with wit, delicate irony, and, above all, individuality; but its promise was never fulfilled.

OLIPHANT, MRS. MARGARET (*née* Wilson), one of the most distinguished of modern female novelists, born at Wallyford, Scotland, in 1820. In 1849 she published her first work *Passages in the Life of Mrs. Margaret Maitland*, which instantly won attention and approval. Its most distinctive charm is the tender humor and insight which regulate its exquisite delineation of Scottish life and character at once in their higher and lower levels. This work was followed by *Caleb Field*; *Merkland*; *Adam Graeme*; *Harry Muir*; *Magdalen Hepburn*; *Lilliesleaf*, and *Katie Stewart*; *The Quiet Heart*, and *Zaidee*. Though these are of somewhat various merit, in all of them the peculiar talent of the writer is marked. They are rich in the minute detail which is dear to the womanly mind; have nice and subtle insights into character, a flavor of quiet humor, and frequent traits of delicacy and pathos in the treatment of the gentler emotions. It was, however, by the *Chronicles of Carlingford* that her reputation as a novelist was first secured. In the first of them, *The Doctor's Family*, the character of little Netty, the heroine, vivifies the whole work, and may rank as an original creation. The next in the series, *Salem Chapel*, perhaps indicates a wider and more vigorous grasp than is to be found in any other work of the authoress. Certain of the unlovelier features of English dissent, as exhibited in a small provincial community, are here graphically sketched, and adapted with admirable skill to the purposes of fiction. Mrs. Oliphant has been resident at Windsor for many years. A civil list pension of \$500 was conferred upon her in 1868.

OLIVE, PRINCESS (1772-1834), the title assumed in 1820 by Mrs. Elivia Serres, who claimed to have been born at Warwick, England, in 1772, the granddaughter of the Rev. Dr. Wilmot, her mother being his only daughter, and her father Henry Frederick, Duke of Cumberland, being the youngest brother of George III. In 1791 she married John Thomas Serres, painter, but separated from him in 1803; and between 1805 and 1819 she had published ten volumes of poetry and fiction. She resembled the royal family, and found some people ready to believe her to be really Princess of Cumberland and Duchess of Lancaster. She died in poverty in November, 1834. Lavinia, the elder of two daughters by her husband, married Anthony Thomas Ryves, the adopted son of William Combe ("Dr. Syntax"), only, however, also to separate. She died in 1871.

OLIVENZA, a fortified town of Spain, near the Portuguese frontier, twenty miles southwest of Badajoz. Population, 7,759.

OLIVER, ANDREW, lieutenant-governor of Massachusetts, born in Boston, Mass., March 28, 1706, died March 3, 1774. He graduated at Harvard College in 1724; was a member of the council 1746-66; secretary of the province 1766-70; and in 1765 rendered himself odious to the patriotic party by accepting the office of collector of stamps, which post he was compelled to resign at the "Liberty Tree." He was appointed lieutenant-governor in 1770.

OLIVER, PETER, an American jurist, born in Boston, Mass., March 26, 1713, died in Birmingham, England, Oct. 13, 1791. He graduated at Harvard in 1730; filled various offices in Plymouth county; and although not a lawyer by profession, was made a justice of the supreme court in 1756, and in 1771 became chief justice. He was impeached by the house of representatives in 1774 for refusing to accept the pay voted by the assembly in lieu of a fixed salary from the crown. Siding openly with the royalists, he accompanied the British troops on their retirement from Boston in 1776, and after-

wards went to England, where he received a pension from the crown. He was a writer of considerable talent, both in prose and verse.

OLLA PODRIDA (lit., "putrid pot"), a Spanish national dish, consisting of flesh, fresh and salted, poultry, vegetables, etc., well seasoned with pepper and garlic, and stewed together in a closed pot. The term is applied figuratively to literary productions of very miscellaneous contents. The French equivalent is *pot-pourri*, and the Scotch *hotch-potch*, both of which, but especially the former, are also employed in a figurative sense.

OLLENDORF'S SYSTEM, a method of learning languages, invented by H. G. Ollendorf, and designed for those who teach themselves. The grammars are meant to give the student a mastery of the conversational forms of the language, grammatical rules being few.

OLLIVIER, OLIVIER ÉMILE, a French statesman, born at Marseilles July 2, 1825. Having studied law at Paris, he began to practice as an advocate in that city, and by clever pleading established a reputation at the bar, and after 1864 acquired influence as a member of the legislative assembly. In 1865 the viceroy of Egypt appointed him to a high judicial office in that country. But he still took an active interest in French politics, and in January, 1870, Napoleon III. charged him to form a constitutional ministry. But the real authority of the ministers was practically nil. Ollivier was an unsuspecting tool in the hands of the Imperialists. "With a light heart" he rushed his country into the war with Germany, himself to be overthrown after the first battles. He withdrew to Italy. Ollivier has written books on *Lamartine* and *Thiers*, and *L'Église et l'État au Concile du Vatican*; *Principes et Conduite*; *Nouveau Manuel de Droit Ecclésiastique Français*, and others.

OLNEY, JESSE, an American geographer, born at Union, Tolland county, Conn., Oct. 12, 1798, died at Stratford, July 31, 1872. He was educated at White's borough, N. Y., and was for twelve years principal of the Hartford Grammar school. His school *Geography and Atlas*, first issued in 1828, was at once accepted as a standard work, and caused a complete revolution in the methods of teaching geography. In 1831 appeared the *National Preceptor*, a superior reading manual, which was followed by a series of readers and outline maps, an arithmetic, and a *School History of the United States*. He was for many years a member of the legislature and afterwards comptroller of the State for two terms, and was an active worker in behalf of educational interests.

OLMSTEAD, FREDERICK LAW, landscape-gardener, born at Hartford, Conn., April 26, 1822, studied agricultural science and engineering at Yale in 1845-46, and became a farmer in central New York and afterwards on Staten Island. Becoming interested in landscape-gardening and architecture, he made an extensive pedestrian tour through England and portions of the continent for the purpose of observing the ornamental grounds of the countries, and on his return published some account of his journey in *Walks and Talks of an American Farmer in England*. He afterwards traveled through the Southern and Southwestern States of the Union for the purpose of investigating the influence of slavery on agriculture, and published *A Journey in the Seaboard Slave States* (1856); *A Journey Through Texas* (1857), and *A Journey in the Back Country* (1860). Mr. Olmstead was appointed with Mr. Calvert Vaux, to superintend the construction of Central Park, New York, superintended the reconstruction of the grounds about the Capitol, Washington, and has been identified with the designing of the parks of

Brooklyn, Chicago, Boston, San Francisco, and other cities.

OLNEY, a pleasant little town of England, on the Ouse, eleven miles west by north of Bedford and ten miles southeast of Northampton. At the corner of the market-place still stands the house where Cowper lived from 1767 to 1786, and where he wrote with John Newton the *Olney Hymns*. The place besides has memories of Scott the commentator, William Carey, and many more missionaries. Brewing and bootmaking are industries. Population, 2,347.

OLNEY, a city, the county-seat of Richland county, Ill., about thirty miles west of Vincennes, Ind. It contains fine schools and a number of mills and factories. Population in 1890, 3,728.

OLSHAUSEN, HERMANN, theologian, born at Odeslohe, in Holstein, Aug. 21, 1796, died Sept. 4, 1839. He studied at Kiel and at Berlin under Neander, and became professor at Berlin, Königsberg, and Erlangen. His younger brother, JUSTUS (1800-82), was a distinguished Orientalist; and THEODORE (1802-69) took a prominent part in the Sleswick-Holstein rising, 1848.

OLYMPIA, a town, the capital of Washington, and the county-seat of Thurston county, finely situated on a peninsula at the southern extremity of Puget Sound, one hundred miles north of Portland, Oregon. The harbor is safe and commodious, and is especially adapted for the lumber trade and for shipbuilding. An abundant water-power is afforded by the Des Chutes River, and magnificent forests supply immense quantities of lumber. Commerce and general trade are in a thriving condition; and the facilities for education are excellent.

OLYPHANT, a borough of Pennsylvania, on the Lackawanna River, eight miles north of Scranton. It is an important mining town, and enjoys a large trade connected with the coal business. Population in 1890, 4,075.

OM, a Sanskrit word which, on account of the mystical notions that even at an early date of Hindu civilization were connected with it, acquired much importance in the development of Hindu religion. Its original sense is that of emphatic or solemn affirmation or assent. Later it became the auspicious word with which the spiritual teacher had to begin, and the pupil had to end, each lesson of his reading of the Veda. And ultimately (as equal to *Aum*) it came to be regarded as an abbreviated method of naming the Hindu trinity. In the Lamaist form of Buddhism the "formula of six syllables," *Om mani padme hum*, which is variously interpreted, is the most solemn and sacred of invocations; is the first thing taught to Tibetan and Mongolian children, and the last prayer breathed by the dying man. It is found engraved on rocks, flags, and praying-wheels, and is looked on as the essence of religion and wisdom, and the means of attaining eternal bliss.

OMAHA, a city, the county-seat of Douglas county, Neb., beautifully situated on an elevated plateau on the west bank of the Missouri River. Population in 1890, 139,562. See Britannica, Vol. XVII, p. 771.

OMAR PASHA, a Turkish general, born at Plaski, in Croatia, in 1806 (according to some authorities, in 1811), died at Constantinople, April 18, 1871. His real name was Michael Lattas; he was educated for the Austrian army at the military school of Thurn, near Carlsstadt. Having by a breach of discipline rendered himself liable to punishment, he fled to Bosnia, and, embracing Mohammedanism, gained through his beautiful calligraphy the post of writing-master to Abdul-Medjid, the heir to the Ottoman throne. On his

pupil's accession in 1839 Omar Pasha was raised to the rank of colonel, and in 1842 appointed military governor of the Lebanon. In 1843 he displayed considerable skill and energy in suppressing an insurrection in Albania, and in the following years others in Bosnia and Kurdistan. - On the invasion of the Danubian Principalities by the Russians in 1853, Omar Pasha collected an army of 60,000 men, and, crossing the Danube in presence of the enemy, intrenched himself at Kalafat, where he successfully withstood the Russians; after they withdrew from the Principalities, Omar Pasha entered Bucharest in triumph in August, 1854. February 9, 1855 he embarked for the Crimea, and on the 17th of the same month repulsed with great loss 40,000 Russians who attacked him at Eupatoria. He was soon afterwards sent to relieve Kars, but arrived too late. In September, 1861, he was charged to pacify Bosnia and Herzegovina, which were again in insurrection. This being accomplished, he attacked the Montenegrins, captured Cetinje, and overran the country in 1862.

OMBRE (through the Fr. from Span. *hombre*, "man"), a game of cards borrowed from the Spaniards, and usually played by three persons, though sometimes by two and by five. The game is played with forty cards (the eights, nines, and tens having been removed), and each player receives nine cards, three by three. The game is often referred to in English 18th-century literature.

OMEARA, BARRY EDWARD, physician to Napoleon on St. Helena, born in Ireland in 1786, died in London, June 3, 1836. He first served as surgeon in the army, but was dismissed from the service in 1808 for a discreditable share in a duel at Messina. Later he entered the naval department, and was on board the "Bellerophon" when Napoleon surrendered to Captain Maitland. He pleased the great exile, and accompanied him as his private physician to St. Helena. He took part with Napoleon in his squabbles with the governor, Sir Hudson Lowe, and was imprisoned and compelled to resign his post in 1818. On his return to England he asserted in a letter to the Admiralty that Sir Hudson Lowe had dark designs against his captive's life, and had attempted insidiously to corrupt himself. For this monstrous charge he was dismissed from the service. His *Napoleon in Exile* made a great sensation, and is still valuable if read with caution.

OMPHACITE (Gr. *omphaka*, "unripe grape"), a grass-green granular variety of Pyroxene, one of the constituents of Eclogite.

OMRO, a village of Wisconsin, on Fox River, ten miles west of Oshkosh, contains an excellent high-school and a large number of mills and manufacturing.

ONAGRACEÆ, a natural order of exogenous plants, chiefly herbaceous; with simple leaves and axillary or terminal flowers. There are about 450 known species, natives chiefly of temperate climates, among which are some much cultivated for the beauty of their flowers, particularly those of the genera *Fuchsia*, *Enothera* (Evening Primrose), *Clarkia*, and *Godetia*. A few species produce edible berries, and the roots of one or two are eatable; but none are of economic importance. The root of *Isnardia alternifolia*, found in the marshes of Carolina, and called *Bowman's Root*, is emetic. Some species of *Jussiaea* are used in dyeing in Brazil.

ONARGA, a village of Illinois, about eighty miles south of Chicago. It is the seat of several educational institutions, and contains a variety of manufacturing.

ONCIDAS, a tribe of North American Indians, formerly belonging to the "Five Nations," collect-

ively the Iroquois, which occupied the greater part of the State of New York.

ONCKEN, JOHANN GERHARD, a German evangelist, born at Varel, in Oldenburg, in 1800, died in 1884. In 1834 he adopted Baptist views and became the pastor of the first Baptist church in Germany. Soon after he was appointed a missionary of the American Baptist Convention. His religious work was conducted throughout Germany, Switzerland, and Denmark, by preaching, distributing the Scriptures, and organizing congregations. His labors were so successful, that he became widely known as the "German Apostle." In the prosecution of his work he also visited the United States in 1852 and again in 1865. Oncken published many religious tracts and some journals.

O'NEALL, JOHN H., born near Newberry, S. C., Oct. 30, 1838. He was left an orphan at the age of eight years, and became an inmate of his grandfather O'Neall's family, who resided in Daviess County; worked on a farm till he was twenty-one years of age, attending the country school two and three months during the winter; entered the Indiana State University in 1859, graduating therefrom in 1862; read law under the directions of Judge William Mack, of Terre Haute, and was admitted to the bar; graduated from the Law Department of the Michigan University in 1864; located in Washington the same year, and has practiced his profession since; represented Daviess County in the State Legislature in 1866; was appointed Prosecuting Attorney for the Eleventh Judicial Circuit in 1873; was elected to the same office in 1874, but resigned before his term was out; and was elected to Congress in 1887.

ONEIDA, a village of New York, on Oneida Creek, midway between Utica and Syracuse. It is the center of trade of a rich hop and dairy district, and the seat of numerous important manufacturing.

ONEIDA COMMUNITY, a village of New York, four miles south of Oneida. It has an excellent water-power, and is the headquarters of the numerous manufacturing of the community formerly presided over by John Humphrey Noyes.

O'NEIL, JOSEPH H., born in Fall River, Mass., March 23, 1853. He received a common-school education; was a member of the Boston school committee in 1875; a member of the Massachusetts house of representatives in 1878, '79, '80, '81, '82, and '84; a member of the board of directors for Public Institutions for five years, the last eighteen months being chairman of the board; was city clerk of Boston in 1887 and '88; and was elected to Congress in 1889.

O'NEILL, CHARLES, born in Philadelphia, March 21, 1821. He graduated at Dickinson College in 1840; studied and practiced law; was a member of the house of representatives of Pennsylvania in 1850, '51, '52 and '60; was a member of the State senate of Pennsylvania in 1853; and was elected to Congress in 1863.

O'NEILL, JOHN J., a manufacturer, born June 25, 1846, of Irish parents. He received a common school education; was in the Government Civil Service during the war of the Rebellion; was elected a member of the Missouri State legislature from St. Louis in 1872, 1874 and 1876, and a member of the municipal assembly of St. Louis in 1878 and 1881. In politics he is a Democrat, and was elected a representative from the eighth Congressional district of Missouri to the 48th, 49th and 50th Congresses. In 1890 he was elected from the same district to the 52nd Congress.

ONEONTA, a village of New York on the Susquehanna River, sixty miles east of Binghamton. It contains the shops of the Albany and Susque-

hanna Railroad, and a number of mills and factories. Population of township in 1890, 6268.

ONION, some species of the genus *Allium*, the most important of which is *A. cepa*. It is a well-known biennial plant. The root bears a truncated bulb, round, and often compressed. The scape appears in the second year and grows about three feet high, straight, smooth, bearing at top a large round umbel of greenish white flowers. It is universally cultivated for the kitchen, and the peculiar merits of its bulb, and the young stem as a potherb and a condiment are well known.

ONONDAGAS, a tribe of North American Indians, formerly belonging to the "Five Nations," which occupied the greater part of the present State of New York.

ONTARIO, the easternmost and smallest (7,240 square miles) of the five great lakes of North America. It receives at its southwest corner the water of the upper lakes by the Niagara River, and at its northeast corner it issues into the St. Lawrence. See Britannica, Vol. XVII, p. 451; Vol. XXI, pp. 180, 182.

ONUS PROBANDI, that is, the burden of proof, often a difficult question in litigation. As a rule the plaintiff who institutes the suit is bound to give proof of the allegations on which he relies.

OOGONTZ, the name of an Indian chief formerly residing at Sandusky, Ohio. Later the name was given by Jay Cook (who in early life resided at Sandusky, and whose father's residence occupies the site of the home of the Indian chief), to his mansion near Philadelphia, Pa. Still later, Mr. Cook's residence and grounds were dedicated under the same Indian name to the uses of the public as a 'Ladies' Seminary of high grade. Since the date of the famous Indian chief, here mentioned, Sandusky has become a beautiful city, and the visitors thereto could walk on "Ogontz Street," eat bread made of flour from "Ogontz Mills," look out upon a procession of masons belonging to "Ogontz Lodge," and listen to the hurrying tramp of the "Ogontz Fire Company."

OORI, a river of southeastern Africa, which has its source in the heart of the Transvaal, between Pretoria and Potchefstroom, describes a huge curve to the north, and joins the Indian Ocean a little north of Delagoa Bay. Its course exceeds 800 miles, and it has numerous tributaries, the most important being the Olifant from the right. It has been ascended 50 miles by steamboat; but its upper reaches are obstructed by rapids and falls.

OOSTERHOUT, a Dutch town in North Brabant, six miles northeast of Breda, with sugar-factories, tan-yards, breweries, potteries. Population, 10,911.

OOSTERZEE, JAN JAKOB VAN, theologian, born at Rotterdam in 1817, died July 29, 1882. He studied at Utrecht, was a pastor in Rotterdam, and in 1862 became a theological professor at Utrecht, being the leader of the Evangelical school in Holland. He wrote many works, amongst them a Life of Christ, a Christology, a work on John's Gospel, commentaries on Luke and the Pastoral Epistles in Lange's Commentary; also a *Theology of the New Testament*; *Christian Dogmatics*; *Moses*, and *Practical Theology*.

OPACITE, a name given by petrologists to minute black, opaque, amorphous aggregates, grains, and patches of indeterminate mineral matter, which are seen in many igneous rocks when these are viewed in thin slices under the microscope. Opacite is probably in most cases hematite, limonite, magnetite, or other iron oxide, and is a product of the chemical alteration of one or other of the original mineral constituents of the rock in which it occurs.

OPELIKA, a city, the county seat of Lee county, Ala., thirty miles northwest of Columbus. It contains a number of educational institutions and manufacturing establishments. Population in 1890, 3,686.

OPELOUSAS, a village, the capital of St. Landry parish, La., sixty miles west of Baton Rouge. It contains a convent and an academy, and is an important shipping point for cotton.

OPERA, a musical drama, an extended dramatic composition in which music forms an essential and predominant factor, and not a mere accessory accompaniment. The words are called *libretto*. They are the peg on which to hang the music, the latter being the principal part. The component parts of an opera are recitations, arias, duets, trios, quartettes, choruses, and finales, accompanied throughout by an orchestra. The whole is preceded by an instrumental *overture*. "Recitative" is declamation which strives to assimilate itself to the accents of speech, and for this purpose sacrifices portions of the musical rhythm. It is speaking in successive musical tones. "Arias, duets, or trios" are melodies for one, two, or three voices, usually with elaborate accompaniments. In the "choruses" the dramatic element usually predominates. They are often wrought into noteworthy climaxes of great musical and dramatic interest. The "instrumental elements" include both accompaniments and independent passages. The latter comprise, beside the overtures, intermezzi, marches, dances, etc., which connect, supply, or embellish the links of the chain of dramatic incident. The "ballet" is often added either as an incidental diversion or as a component part of the dramatic action itself.

The oldest opera is the Italian. It had an unbroken course of development since 1600. In Germany and France it began to be diligently cultivated about 1650, and in England somewhat later. Italian operas have tended toward a lyrical extreme, to the neglect of the dramatic truth; while German operas have strongly emphasized the romantic and strictly dramatic elements. French operas have often sought very much for comic and spectacular effects. The Wagnerian operas elaborate the orchestral effects very considerably, and unify the poetic, musical, dramatic, and scenic elements more than others.

The maintenance of expensive opera-houses, with regular seasons of performances, is in most European countries a matter of governmental appropriation. There the opera has become a powerful factor in the social and artistic life of all large cities.

Among the different varieties of operas we have the *grand* or *serious*, *dramatic*, *comic*, the *opera bouffe*, the *ballad opera*, etc. "Grand or serious operas" have an elaborate plot and dignified character; the entire work is set to music. "Comic operas" (*operas bouffes*) contain frequently spoken dialogues. The farce plays here an important part. A "ballad opera" is a light dramatic work into which ballads and popular songs are interwoven.

OPERA-GLASS, a double telescope, used for looking at objects that require to be clearly seen rather than greatly magnified, such as the performers at a theatre or opera. The opera glass is short and light, and can be easily managed with one hand. Its small magnifying power, and the large amount of light admitted by the ample object-glass, enable it to present a bright and pleasant picture, so that the eye is not strained to make out details, as in telescopes of greater power, which generally show a highly magnified but faint picture. It allows the use of both eyes, which gives to the spectator the double advantage, not

possessed by single telescopes, of not requiring to keep one eye shut, and of seeing things standing out stereoscopically as in ordinary vision.

OPHI OGLOSSEÆ, a sub-order of filices or ferns, consisting of rather elegant little plants with an erect or pendulous stem, which has a cavity instead of pith, leaves with netted veins, and the spore-cases collected into a spike formed at the edges of an altered leaf, two-valved, and without any trace of an elastic ring. They are found in warm and temperate countries, but abound most of all in the islands of tropical Asia.

OPHITES, a class of Gnostics, who, while they shared the general belief in dualism, the conflict of matter and spirit, the emanations, and the Demi-urges, were distinguished by giving a prominent place in their systems to the serpent.

OPHITIC STRUCTURE, a name given by petrologists to a structure seen in various crystalline igneous rocks, in which large plates of a pyroxene are penetrated and divided, as it were, into small portions, by crystals of felspar. The separated portions of the pyroxene, however, are in crystalline continuity, since they all possess the same optic orientation.

OPIMUM. See *Britannica*, Vol. XVII, pp. 787-794. In the United States there are some places called "opium-joints," where opium is smoked. They are in most large cities, but especially in New York and San Francisco. The State of New York has a law which makes it an offense to keep an opium-joint. This law keeps white people out of the joint, but it seems that the Chinese smoke opium at the joints as much as they please.

It is evident that the use of opium as a stimulant is increasing in the United States. Some medical men think that this is caused by the fact that whisky is less commonly used than 20 years ago, especially among American women. Opium-eating is very disastrous to the morals of those who indulge in it. All opium prepared for smoking comes from China, where the right to prepare it is sold by the government to the highest bidder. The crude opium comes mostly from Smyrna, it being a product of Turkey in Asia. The importation of smoking opium had increased from 49,875 pounds in 1872 to 66,232 pounds in 1887. This increase took place in spite of the fact that the United States government increased the duty in 1883 from \$6 a pound to \$10 a pound. The quantity of crude opium imported into this country rose from 189,354 pounds in 1872 to 568,263 pounds in 1887. Its price rose from \$2.50 in 1886 to \$4.75 in 1887, and still higher in 1888.

OPPOSSUM, a name which has been applied to certain Australian forms, but is better restricted to the American opossums, the only marsupials found in America. They range from the United States to the Argentine Republic. There are altogether 23 distinct species, with a considerable range in size, varying from that of a large cat to that of a mouse. The best known is the Virginia opossum. Although there are now no opossums found anywhere but in America, they existed formerly in Europe, as is shown by their fossil remains. The opossums are all carnivorous; one species, the crab-eating opossum, is a native of tropical America. Many species carry the young on the back; this is due in many cases to the fact that there is no pouch. The Virginian opossum is a foe to poultry-yards. Hunting the opossum is a favorite sport in the Southern States. The expression, "playing 'possum," refers to the opossum's habit of feigning death when caught. See *Britannica*, Vol. XVII, pp. 796-97.

OPOTECA, a sleepy town of 1,000 inhabitants, in Honduras, about 15 miles northwest of Coma-

yagua. It was formerly famous for its great silver mines.

OPPERT, JULES, a French Orientalist, born at Hamburg in 1825, of Jewish parentage. He studied at Heidelberg, Bonn, and Berlin, and took the degree of Ph. D. at the University of Kiel, in 1847. After that he studied chiefly the Zend language and literature. In 1854 he laid before the French Institute his method of deciphering the cuneiform inscriptions, and received for his achievement the grand prize of 20,000 francs. In 1857 Oppert was made professor of Sanskrit in the school attached to the Imperial library. In 1869 he also began to teach in the Collège de France, and in 1874 he was made full professor there. Among his published works are *Etudes assyriennes*; *Grammaire sanscrite*; *Histoire des empires de Chaldée et d'Assyrie*; *Babylon et les Babyloniens*; *Mélanges perses*; *Le peuple et la langue des Mèdes*; *Fragments mythologique* (1882). His brother, ERNST JACOB OPPERT, born at Hamburg in 1832, went to China in 1851 as a merchant, and made several visits to Chorea, the results of which he published in *A Forbidden Land* (1879). Another brother, GUSTAV SOLOMON OPPERT, born in 1836, became professor of Sanscrit in the University of Madras in 1872. He has published treatises *On the Classification of Languages*; *On the Weapons of the Ancient Hindoos*; and *Contributions to the History of Southern India* (1882).

OPPORTUNISTS, in French politics those who, like Gambetta, Ferry, and others like-minded, oppose doctrinaire as well as extreme views, accommodate themselves in great measure to the circumstances of the hour, and aim only at what can obviously be carried through.

OPUS OPERATUM, the phrase employed in the Catholic theological schools to describe the manner of operation of the sacramental rites in the production of grace. It is intended to imply that the ministration of the rite is in itself, through the institution of Christ, an efficient cause of grace, and that, although its operation is not infallible, but requires and pre-supposes certain dispositions on the part of the recipient, yet these dispositions are but *conditiones sine qua non*, and do not of themselves produce the grace. Hence, when the sacraments are administered to dying persons in a state of apparent insensibility, this is done in the hope and on the presumption that the dying person may, though seemingly unconscious, be nevertheless really disposed to receive the sacrament; but it is by no means held that if these dispositions be wanting the sacrament will itself justify him.

ORANGE, the fruit of a tree of the genus (*Citrus Aurantium*), now raised in large quantities in Florida. The Florida orange is of acknowledged excellence, and this makes it a formidable rival to the oranges of Southern Europe and the West Indies, our former sources of supply. The superior ripe fruit which we receive cheap from Florida, is fast superseding the half-ripe fruit hitherto shipped to the United States from Italy and Spain. It is sweet, of the finest flavor, and has no superior in juiciness. A single acre planted with orange trees in Florida, has been known to produce ten tons of oranges.

Another locality of the American orange is Louisiana, especially the district extending along the west bank of the Mississippi from a point about forty miles below New Orleans to the vicinity of Fort Jackson. For thirty miles in length there is here an almost continuous orange-grove, some of the orchards being very extensive. The Louisiana oranges resemble those of Florida, though the yield per tree is said to be much larger than in Florida.

The third important region of orange culture in the United States is Southern California. Here large crops of oranges are raised, which, like California fruits generally, are of much larger size than others, but are somewhat deficient in flavor as compared with the Florida fruit. But for this the orange culture would spread rapidly over the Sacramento valley, for the yield of the bearing trees there is abundant. At present Florida supplies the market along the Atlantic coast; Louisiana supplies the people of the Mississippi valley; and Southern California supplies the Pacific coast and Western States. See *Britannica*, Vol. XVII, pp. 810-812.

ORANGE, or **GARIEP**, the largest river of South Africa. It rises in the Kathlamba Mountains, in the east of Basutoland, and flows west, with an inclination to the north, to the Atlantic Ocean. It describes numerous wide curves in its course of 1,000 miles, and separates Cape Colony, on the south, from the Orange Free State, Griqualand West, Bechuanaland, and Great Namaqualand, on the north. Area of basin, 325,000 square miles. Its volume varies greatly between the dry season, when it is not navigable, and the rainy season, when it overflows its banks in the upper parts of its course. Its mouth is, moreover, obstructed by a bar.

ORANGE, a village in Orange township, Franklin county, Mass., on Miller's River, twenty miles east of Greenfield. It is the seat of a variety of manufactories. Population of township in 1890, 4,563.

ORANGE, a handsome city of New Jersey, thirteen miles west of New York. Population in 1890, 18,774. See *Britannica*, Vol. XVII, p. 813.

ORANGEBURG COURTHOUSE, a village, the county-seat of Orangeburg county, S. C., fifty miles south of Columbia. It is an important market for lumber, turpentine, rice and cotton, contains a variety of manufactories, and is the seat of several educational institutions, including Claflin University and the South Carolina Agricultural College. Population in 1890, 2,953.

ORANGE, FREE STATE OF. For general article on this republic, see *Britannica*, Vol. I, p. 270; Vol. V, p. 45; Vol. XVII, p. 813. The latest accredited authorities report the estimated area at 41,500 square miles. The territory is now divided into 18 districts. At a census taken in 1880, the white population was found to be 61,022—31,906 males and 28,116 females. Of this population 42,439 were born in the Free State and 14,149 in the Cape Colony. There were besides 72,496 natives in the state—38,244 males and 34,252 females—making a total population of 133,518. The capital, Bloemfontein, had 2567 inhabitants in 1880. Of the white population 11,111 were returned in 1880 as directly engaged in agriculture, while there were 63,881 "colored servants." Immigration is on the increase, mainly from Germany and England.

CONSTITUTION AND GOVERNMENT.—The legislative authority is vested in a popular assembly, the "Volksraad" of 57 members, elected by suffrage of the burghers (adult white males) for four years from every district, town, and ward, or field-cornetcy in the country districts. Every two years one-half of the members vacate their seats and an election takes place. The members of the Volksraad receive pay at the rate of 2*l.* per day. Eligible are burghers 25 years of age, owners of real property to the value of 500*l.* Voters must be white burghers by birth or naturalization, be owners of real property of not less than 150*l.*, or lessees of real property of an annual rental of 36*l.* a yearly income of not less than 200*l.*, or be owners of per-

sonal property of the value of 300*l.*, and have been in the state for not less than three years.

The executive administration is lodged with a president chosen for five years by universal suffrage, who is assisted by an executive council. The executive council consists of the government secretary, the landrost of the capital, and three unofficial members appointed by the volksraad, one every year for three years.

Judge Reitz, president of the republic, was sworn into office Jan. 11, 1889.

EDUCATION, FINANCE AND DEFENSE.—The system of education is national. Small grants are also made to the Episcopal and Roman Catholic churches. The government schools are managed by elected local boards, which choose the teachers, who are appointed by the president, if he is satisfied with their qualifications. Education is not compulsory nor free except for very poor children. In 1889 15,000*l.* was allotted to education, being a portion of interest on a capital of 200,000*l.* set apart by the volksraad for this purpose. There are no foundations, properly so-called, for education. In 1889 there were 49 government schools, inclusive of the two higher schools and the infant school at Bloemfontein, with 2,139 pupils and 74 teachers. Grants are made to private schools on certain conditions. In 1889 there were 14 such schools with 211 pupils. The Gray College, the highest school for boys, prepares candidates for the matriculation examination of the Cape University; there is a similar school for girls.

At the census of 1880 only 1,080, or 2.6, of the white population above seven years of age could not read nor write, while 3,864 could only read.

There is a good public library in Bloemfontein, the capital, and small libraries in several villages.

Every able-bodied man in the republic between 16 and 60 years of age is subject to military service. The number of burghers available for such service in 1890 was 13,490.

The revenue in 1890 aggregated £272,322; the expenditure to £205,100; the imports were valued at about £900,000, and the exports at nearly £1,000,000.

ORBIGNY, ALCIDE DESSALINES D', a French naturalist, born at Coneron in 1802, died at Pierrefitte in 1857. In 1826 he went to South America, where he spent eight years in scientific exploration from Brazil and Peru to Patagonia. In 1852 he was made professor of palaeontology at the museum of Natural History at Paris. His best known works are *Voyage dans l'Amérique du Sud* (9 vols.) and *Palléontologie française* (14 vols.). He also contributed to the *Dictionnaire Universel d'histoire naturelle* (24 vols.), edited by his brother Charles Dessalines d'Orbigny, conservator of the Museum of Natural History of Paris.

ORCHARDSON, WILLIAM QUILLER, a genre-painter, who is considered to bear the palm in this branch of art, surpassing all other English physiognomists in accuracy, expression, and dexterous execution. He was born in 1835 in Edinburgh, where subsequently he studied under Scott Lauder at the Trustees' Academy; he became A. R. A. in 1868, R. A. in 1877, and received a medal of honor at the *Exposition Universelle*, 1878.

ORCHIDS. See *Britannica*, Vol. XVII, pp. 816-818. The Orchid family (*Orchidaceæ*) includes in all 394 genera and about 3,000 species. They are found all over the world, but the United States have only few native species of orchids. The tropical species are epiphytes, that is, they grow on trees and stones, and derive their chief nourishment from the air. Florists have lately cultivated some tropical epiphytes in greenhouses, they being

greatly admired for their beauty or singularity. Orchids growing native in the temperate zones are terrestrial. These forms are propagated by division of the tubes or of the pseudo-bulbs, each piece having one or more. Those in aerial roots are similarly propagated by division, the seeds being rarely used for this purpose. They grow best if attached to blocks of wood or placed in baskets, and hung from the roof of the greenhouse. They seldom need water at the roots, but require much water upon their leaves.

ORCIN, a substance found in the free state in the lichens from which Archil and Litmus are prepared. It is formed when the acids which occur in these plants are boiled with baryta water or submitted to dry distillation. It is also prepared artificially from the nitro-derivates of the hydrocarbon toluene. It is a di-acid phenol, and appears in large colorless crystals which turn a reddish-brown color when exposed to the air. By the action of ammonia and the oxygen of the air it is converted into orcein, which is the coloring matter of archil.

ORD, EDWARD OTHO CRESAP, born in Cumberland, Md., Oct. 18, 1818, died in Havana, Cuba, July 22, 1883. He graduated at the United States military academy in 1839, served in Florida against the Seminole Indians until 1842, and from that date until the beginning of the civil war was chiefly employed on frontier duty. In Sept., 1861, he was appointed brigadier-general of volunteers, and soon afterwards assigned to command a brigade of Pennsylvania reserves. On the 2nd day of May, 1862, he was made major-general of volunteers and transferred to a command in the Department of the Mississippi, participating in the battle of Iuka and the action on the Hatchie, commanded the 13th army corps during the siege and capture of Vicksburg and capture of Jackson; and in July, 1864, was given command of the 8th army corps and the troops in the Middle department. After confidence had been restored, he was placed in command of the 18th army corps near Petersburg, Va., and took part in the movements before that city, and in the capture of Fort Harrison. In Jan., 1865, he was given command of the Army of the James and the Department of Virginia, and took part in the operations resulting in the evacuation of Richmond and the surrender of General Lee. He was then given the Department of the Ohio. In Sept. 1866, he was mustered out of the volunteer service, having, however, been previously appointed a brigadier-general in the regular army. He commanded various military departments (1866-80); retiring in 1881 with the rank of major-general.

ORD, GEORGE, an American naturalist, born in Philadelphia, Pa., in 1781; died there Jan. 24, 1866. He was an enthusiastic student of natural history, and, though of a retiring disposition, was highly esteemed by his associates in scientific investigations, especially in the department of ornithology. He was a fellow of the Linnæan Society of London, vice-president of the American Philosophical Society, and president of the Academy of Natural Sciences of Philadelphia in 1851-1858. He was an intimate friend of Alexander Wilson, the ornithologist. Mr. Ord, after Wilson's death in 1813, completed the eighth volume of the latter's *American Ornithology* (Philadelphia, 1814), and wrote the entire letter-press of the concluding volume. See *Britannica*, Vol. XXIV, p. 590.

ORDER, in natural history, a group inferior to class and sub-class, but superior to family, genus, etc. The term natural order is used in botany to express genuine relationship in contrast to purely artificial grouping, but all orders now recognized are supposed to be more or less "natural."

ORDNANCE. See GUN-MAKING and GUNNERY in *Britannica*, Vol. XI, pp. 278-315; and also GUNS and GUNBOATS in these Revisions and Additions.

ORDOVICIAN, a name sometimes given to a geological formation intermediate between Cambrian and Silurian; otherwise accounted the Lower Silurian strata. It is so called from the Ordovices, an ancient British tribe.

OREGON, a village, the county-seat of Ogle county, on Rock River, Oregon, twenty-five miles south of Rockford. It is beautifully situated, and contains a high-school and numerous manufactories.

OREGON, STATE OF, for general article on Oregon, see *Britannica*, Vol. XVII, pp. 822-825. The census of 1890 reports the area and population as follows: Area, 96,030 square miles; population, 313,767, an increase during the decade of 138,899. Capital, Salem, with a population of 4,515. The following shows the population of the cities which in 1890 had each over 8,000 inhabitants; also their population in 1880 and their increase during the decade:

Cities.	1890.	1880.	Increase.	Per cent.
East Portland.....	10,532	2,234	7,598	258.96
Portland.....	46,385	17,577	28,808	163.90

The census returns of several other cities and towns are as follows: Astoria, 7,071; Eugene, 3,958; Salem, 4,515; The Dalles, 3,015; Albina, 5,104.

AREAS AND POPULATION BY COUNTIES.—The land areas in square miles, and the population, severally, of the counties of the State were as follows in 1890:

Counties.	Area.	Population.	
		1890.	1880.
Baker.....	1,970	6,764	4,616
Benton.....	1,370	8,650	6,403
Clackamas.....	1,684	15,233	9,260
Clatsop.....	815	10,016	7,222
Columbia.....	693	5,191	2,042
Coos.....	1,750	8,874	4,834
Crook.....	8150	3,244	.....
Curry.....	1,500	1,709	1,208
Douglas.....	4,875	11,864	6,696
Gilliam.....	1,700	3,600	.....
Grant.....	5,472	5,080	4,303
Harney.....	10,000	2,559	.....
Jackson.....	2,880	11,455	8,154
Josephine.....	1,805	4,878	2,485
Klamath.....	5,520	2,444	.....
Lake.....	8,040	2,604	2,804
Lane.....	3,860	15,198	9,411
Linn.....	2,700	16,265	12,676
Malheur.....	9,936	2,601	.....
Marion.....	830	22,934	14,576
Morrow.....	2,020	4,205	.....
Multnomah.....	440	74,884	25,303
Polk.....	615	7,858	6,601
Sherman.....	510	1,792	.....
Tillamook.....	1,525	2,932	970
Umatilla.....	2,885	13,381	9,607
Union.....	3,135	12,044	6,650
Wallowa.....	2,890	3,661	.....
Wasco.....	3,315	9,183	11,120
Washington.....	645	11,972	7,682
Yamhill.....	640	10,692	7,945

Progress of population in Oregon by decades: 1850, 13,294; 1860, 52,465; 1870, 90,923; 1880, 174,768; 1890, 313,767.

GOVERNORS OF OREGON.—The following is a complete list of the governors of the State, with the periods and dates of services:

PROVISIONAL.

George Abernethy, 1845-49.

TERRITORIAL.

Joseph Lane	1849	George L. Curry	1858-54
John P. Gaines	1849-53	John W. Davis	1854
Joseph Lane	1853	George L. Curry	1854-59

STATE.

John Whittaker	1859-62	S. F. Chadwick	1877-78
Addison C. Gibbs	1862-66	Wm. W. Thayer	1878-82
George L. Woods	1866-70	Z. F. Moody	1882-87
Lafayette S. Grover	1870-77	Sylvester Pennoyer	1887-95

The governor's official term closes Jan. 14, 1895. The governor's salary is \$1,500.

CONDENSED HISTORIC OUTLINE.—Oregon was the name formerly given to the whole territory north of the Rocky Mountains, claimed by the United States, as far north as lat. 54° 40' north. This claim was resisted by the British government, which asserted a right to the entire territory, and in 1818 a treaty was made, and renewed in 1827, giving joint occupation, which was terminated in 1846 by notice from the United States Government, and the question seemed likely to involve the two countries in war, when a compromise was offered by Lord Aberdeen, on the part of the British government, and accepted by the United States, by which the boundary was settled on the 49th parallel. The northern portion is now Washington, and the eastern, Idaho. The coast was discovered, and Columbia River entered in 1792, by Captain Gray, of Boston. It was explored in 1804 and 1805 by Captains Lewis and Clark, United States Army. In 1811, John Jacob Astor founded Astoria as a trading-dépot of the American Fur Company, but sold out afterwards to the Northwest Fur Company. The Territorial government was organized in 1848, and in 1859 it was admitted as a State. Since the completion of the Pacific railroads its growth has been very rapid.

OREGON CITY, a town, the county-seat of Clarkamas county, Oregon, situated in a cañon on the Willamette River, about fifteen miles south of Portland. It has an excellent water-power and a number of mills and factories.

O'REILLY, JOHN BOYLE, author, born at Dowth Castle, County Meath, Ireland, June 28, 1844, learned type-setting, and afterwards became a reporter for English journals. He joined the Fenian society, and returning to Ireland in 1863 enlisted in the 10th Hussars for the purpose of propagating revolutionary principles. His connection with Fenianism was discovered and he was tried for treason and sentenced to be shot, but the sentence was commuted to imprisonment. Sent to Australia in 1867, he escaped, and in 1869 came to the United States. He lectured and wrote for the journals for a time, and afterwards became editor and principal owner of the Boston "Pilot." He has published *Songs of the Southern Seas; Songs, Legends, and Ballads; Moondyne*, a novel; *Statues in the Block; In Bohemia; The Evolution of Straight Weapons*, and a work on the material resources of Ireland. He died in 1890.

ORELLANA, FRANCISCO, a Spanish adventurer, born in Trujillo about 1500, died in 1545. He participated in the conquest of Peru, and commanded under Gonzalo Pizarro in the exploration of regions east of the Andes. Pizarro's expedition left Quito in December 1539, and on arriving at the Coca, Orellana, with sixty men, was sent out in a boat to explore the river and search for provisions; but he

did not return. After many days he reached the mouth of the Napo; passed into the Amazon; and in the latter part of August, 1540, reached the Atlantic. Orellana was thus the first European to navigate the Amazon for the greater part of its course. He went immediately to Spain, gave an account of his discoveries, and having obtained a grant of the territory along the river, embarked with four ships and 400 men. The expedition met with many misfortunes, and, after entering the Amazon, Orellana died of a fever.

ORELLI, KASPAR VON, scholar, born at Zürich, Feb. 13, 1787, died there Jan. 6, 1849. Ordained in 1806, he next year became a Reformed preacher at Bergamo; in 1813 a teacher in the cantonal school at Coire; in 1819 professor at Zürich, and in 1833 professor of classical philology in the newly-founded university. Orelli edited many classical authors with great learning, taste, and with acute discrimination, in particular Horace, Tacitus and Cicero.

ORELLI, KONRAD VON, theologian, born at Zürich, Jan. 25, 1846, and studied at Lausanne, Zürich, Erlangen, and especially theology at Tübingen, and Oriental languages at Leipzig. In 1869 he became orphan-house preacher at Zürich, *privat-docent* in 1871, professor extra-ordinary of theology at Basel in 1873, and ordinary professor there in 1881. Among his writings are *Die Alttestamentliche Weissagung von der Vollendung des Gottesreichs*, and admirable commentaries on Isaiah, Jeremiah, Ezekiel, and the Twelve Minor Prophets.

OREODAPHNE, a genus of trees of the natural order *Lauraceæ*, sometimes called Mountain Laurel. *O. opifera* is a native of the countries on the lower part of the Amazon. A volatile oil obtained from the bark is used as a liniment, and when kept for a short time deposits a great quantity of camphor. *O. cupularis* is a very large tree with strong-scented wood, the bark of which yields the cinnamon of Mauritius. It grows also in Bourbon and Madagascar. *O. fatens*, a native of the Canaries, has wood (*Til-wood*) of a most disagreeable odor. *O. bullata*, found at the Cape of Good Hope, is also remarkable for the disagreeable odor of its wood, the *Stink-wood* of the colonists; but it is hard, durable, beautiful, takes an excellent polish, and is used in shipbuilding.

OREODONTS, an extinct family of ungulates, the remains of which occur in the tertiary deposits of North America.

ORGAN. (See Britannica, Vol. XVII, pp. 828-39.) Until the middle of the 19th century little interest was taken in organ-building in America. The erection of the great organ in the Music Hall, Boston, by a German builder, Walcker, of Würtemberg, gave the first impetus to public interest in the matter. Roosevelt, of New York, and Jardine, likewise of New York, are two of the best-known organ-builders in America at the present time. Roosevelt has invented "the automatic adjustable combination," which enables the player to place any required combination of stops under immediate control, and to alter such combinations as frequently as desired. By his construction of the wind-chest, also, each pipe has its own valve, actuated by compressed air. Among the largest organs in America is the organ of the Roman Catholic cathedral, Montreal, of the cathedral of the Holy Cross, Boston, which possesses 83 stops; the Music Hall, Cincinnati, with 96 stops and 4 manuals, and the Tremont Temple, Boston, with 65 stops.

ORGAN REED. The earliest forms of organs in which "free reeds" are used, but no pipes, were the "seraphine" and the "melodeon." The latter was introduced by Carhart and Needham, and G. A. Prince & Co., both of Buffalo, N. Y. The melo-

deon became very popular in this country. Its bellows are worked by the foot. Jeremiah Carhart made several improvements, notably the plan of acting on the reeds by suction, instead of by blowing. This is a characteristic feature of the American organ, the foreign instruments being still worked by forcebellows.

The most important improvement, and the one which has contributed greatly to the present perfection of reed organs, was the discovery made by Emmons Hamlin, then a workman in the factory of Prince & Co., that by twisting and bending the reeds in various ways the quality of the tone was greatly modified and improved. In 1854 he and Henry Mason associated themselves together for the purpose of building reed-organs. In 1868 the firm was re-organized and the firm took the name of the "Mason & Hamlin Organ Company." Their instruments were first introduced in 1861 under the name of American cabinet or parlor organ. The factories of the firm are located at Cambridgeport, Mass., and the home office is in Boston, with branch offices in New York and other cities. They have agents all over the world. The organs produced by Mason and Hamlin have placed this firm in the foremost rank of American reed-organ manufacturers. In 1882 the name of the firm was changed to the Mason & Hamlin Piano and Organ Company.

Another favorably known firm of reed-organ builders is that of Jacob Estey & Co., Brattleboro, Vt. The instruments of this firm rank also among the best both in this country and abroad. Their business was begun as early as 1846. Wilcox & White, of Meriden, Conn., are also building reed-organs. Their business was started in 1876. It grew rapidly, and their organs are now favorably known all over the world.

Beside the manufacturers named numerous other organ builders supply the demand of these instruments in the United States. The American reed-organs are now made in all styles and sizes, some of them even with two or three manuals, which makes them almost equal to small pipe organs in power and resource. These organs have become very popular. It is estimated that there are over 80,000 cabinet or parlor organs sold yearly in the United States, and that they are made by about 250 manufacturers.

ORIENTATION, in architecture, the position of a church so that its chancel shall point towards the east. This was a fashion invariably adopted in northern countries, but not adhered to in Italy and the South. St. Peter's at Rome, for example, has the choir to the west, and the principal entrances towards the east. The orientation of churches is not usually very exactly to the east, and it is supposed that the east end in some cases has been set so as to point towards the place where the sun rises on the morning of the patron saint's day. In other cases the choir and nave are not built exactly in a straight line, the choir thus having a slight inclination to one side, which in the symbolism of the middle ages was supposed to indicate the bowing of our Saviour's head upon the cross.

ORIGINAL PACKAGE LEGISLATION. The important legislation under this name, enacted in 1890 by the Congress of the United States, resulted from the following decision of the United States Supreme Court.

On April 28, 1890, the Supreme Court of the United States, by Chief Justice Fuller (Justices Gray, Harlan and Brewer dissenting), held, in the *Gus. Lelsy case*, that brewers in Illinois had the right to import into Iowa beer and to sell it in original packages, without regard to the law of Iowa. The ground is thus stated in the closing paragraph of the Opinion of the Court.

"The plaintiffs in error are citizens of Illinois, are not pharmacists, and have no permit, but import into Iowa beer which they sell in original packages, as described. Under our decision in *Bowman vs. Chicago, etc., Railway Company* (supra), they had the right to import this beer into that State, and in the view which we have expressed they had the right to sell it, by which act alone it would become mingled in the common mass of property within the State. Up to that point of time, we hold that in the absence of Congressional permission to do so, the State has no power to interfere by seizure, or any other action, in prohibition of importation and sale by the foreign or non-resident importer. Whatever our individual views may be as to the deleterious or dangerous qualities of particular articles, we cannot hold that any article which Congress recognizes as subjects of interstate commerce are not such, or that whatever are thus recognized can be controlled by State laws amounting to regulations, while they retain that character; although, at the same time, if directly dangerous to themselves, the State may take appropriate measures to guard against injury before it obtains complete jurisdiction over them. To concede to a State the power to exclude, directly or indirectly, articles so situated, without Congressional permission, is to concede to a majority of the people of a State, represented in the State legislature, the power to regulate commercial intercourse between the States, by determining what shall be its subjects when that power was distinctly granted to be exercised by the people of the United States, represented in Congress, and its possession by the latter was considered essential to that more perfect Union which the Constitution was adopted to create. Undoubtedly there is difficulty in drawing the line between the municipal powers of the one Government and the commercial powers of the other; but when that line is determined, in the particular instance, accommodation to it, without serious inconvenience, may readily be found, to use the language of Mr. Justice Johnson in *Gibbons v. Ogden*, 8 Wheat, 238, in 'a frank and candid co-operation for the general good.'"

The above decision of the Supreme Court having been brought to the attention of Congress, that body promptly passed the act quoted below, and it was approved by President Harrison, Aug. 8, 1890.

CHAPTER 728. All fermented, distilled, or other intoxicating liquors or liquids transported into any State or Territory remaining therein for use, consumption, sale, or storage therein, shall upon arrival in such State or Territory, be subject to the operation and effect of the laws of such State or Territory enacted in the exercise of its police powers, to the same extent and in the same manner as though such liquors or liquids had been produced in such State or Territory, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise."

ORIOLE. See *Britannica*, Vol. XVII, p. 844; Vol. XII, pp. 696-97.

ORMEROD, ELEANOR A., an English entomologist, the daughter of George Ormerod (1785-1878), the historian. She commenced her contributions to the science of entomology in 1868 in connection with the Bethnal Green Museum. In 1880 she edited the *Cobham Journals*, being the meteorological and other observations made during forty years by Miss C. Molesworth, and involving enormous labor in the consultation of 75,000 observations. In 1882 Miss Ormerod was appointed consulting entomologist of the Royal Agricultural Society, and shortly afterwards became special lecturer on economic entomology at the Royal Agricultural College, Cirencester. Her *Manual of Injurious Insects* and her *Guide to Methods of Insect Life* are the most generally interesting of her works.

ORMOLU, a name sometimes given to brass of a golden-yellow color.

OROBUS, a genus of plants of the natural order *Leguminosae*, sub-order *Papilionaceae*, allied to Vetches, and sometimes called Bitter Vetch. The species are perennial herbaceous plants, chiefly natives of Europe. They afford good food for cattle. The tubers have a sweet taste, resembling that of liquorice, and are sought after by children; they are also bruised and steeped in water in some parts of the Highlands of Scotland to make a fermented liquor, and a kind of liquor is made also by steeping them in whiskey; they are well flavored

and nutritious when boiled or roasted, and are used in this way in the Highlands of Scotland, in Holland, Belgium, and other countries.

ORONO, a village of Maine, on the Penobscot River, eight miles northeast of Bangor. It is chiefly engaged in the lumber business, has numerous manufactories, and is the seat of the State College of Agriculture and the Mechanic Arts.

ORE, JAMES LAWRENCE, born at Craytonville, S. C., May 12, 1822, died at St. Petersburg, Russia, May 5, 1873. He graduated at the University of Virginia in 1842, was admitted to the bar, and practiced at Anderson, S. C. He was a member of the legislature in 1844-45; member of Congress in 1848-59, and was Speaker of the House (35th Congress). He maintained the right of secession in the several States, and was one of the three commissioners sent to Washington in 1860 to treat with the Government for partition of property in South Carolina, and to transact other business. He was Confederate State senator in 1862-65; was chosen governor of South Carolina under the plan of reconstruction, and served until 1868; was elected circuit-judge in 1870; and in 1873 was appointed United States Minister to Russia.

ORSOVA, the name of two towns on the Danube over against the Iron Gates. OLD ORSOVA, a Hungarian place, is 478 miles southeast of Vienna, and is a station for the Danube steamers. Population, 3381.—NEW ORSOVA, on the Servian side, is situated on an island three miles above the former, and thirty-six miles east of Moldova.

ORTEGAL, CAPE, the northwest extremity of Spain in Galicia.

ORTHODOXY (Gr. *orthos*, "right," and *doxa*, "an opinion"), a name given by theologians to religious opinions in agreement with Scripture and historical tradition, or with the interpretation of these entertained by the particular church to which they themselves belong. The antithesis of *orthodoxy* is *heterodoxy* (*heteros*, "other"—i. e. "wrong," and *doxa*, "opinion").

ORTHOEPY (Gr. *orthos*, "right," *epos*, "a word") a branch of grammar that treats of the correct pronunciation of the words of a language.

ORTON, JAMES, an American naturalist, born at Seneca Falls, N. Y., April 21, 1830, died in Peru, Sept. 25, 1877. He graduated at Williams College in 1855, and at Andover Theological Seminary in 1858; spent some time in travel in Europe and the East; became a Congregational minister in 1860; was appointed instructor in natural science in the University of Rochester in 1866, and in 1869 was called to the chair of natural history at Vassar College, which he held until his death. During several visits to South America Professor Orton made a careful study of the physical geography of the west coast and the Amazon valley, contributing much to the exact knowledge of that country. His publications include *The Andes and the Amazon*; *Underground Treasures*; *Liberal Education of Women*, and *Comparative Zoölogy*.

ORTONA, a town of Italy, on the Adriatic, 104 miles southeast of Ancona. It has a cathedral and a recently improved harbor. Population, 6,366.

OSAGE, a village, the county-seat of Mitchell county, Iowa, near Red Cedar River, eighteen miles north of Charles City. It contains an academy and numerous important manufactories.

OSAGE CITY, a village of Kansas, thirty-five miles south of Topeka, extensively engaged in coal-mining and flag stone-quarrying. It has rich beds of yellow ochre, and contains several mills. Population in 1890, 3,322.

OSAGE MISSION, a village of Kansas, on the Neosho River, thirty-five miles southwest of Fort

Scott. It is the seat of several educational institutions, and is extensively engaged in the grinding and shipping of grain.

OSAGE ORANGE (*Maclura aurantiaca*), a tree of the natural order *Urticaceæ*, a native of North America. It attains a height varying from 20 to 60 feet. The wood which is bright yellow, is fine-grained and very elastic, and takes a high polish. The tree is largely employed in America, especially in the west, as a hedge plant. Its fruit is about the size of a large orange, has a tuberculated surface of a golden color, and is filled internally with radiating, somewhat woody fibres, and with a yellow milky juice, whose odor is generally disliked, so that the fruit, although not unwholesome, is seldom eaten.

OSAGES, a tribe of American Indians; of the Dakota stock, formerly very troublesome, but now settled in the north of Indian Territory, with Quaker teachers. They number about 1,200.

OSBORNE, EDWIN S., born at Bethany, Pa., August 7, 1839. He was educated at the university of northern Pennsylvania and at the New York State and National Law School, graduating in the class of 1860, and receiving the degree of LL. B.; is by profession a lawyer; served in the Union Army during the war; was commander of the Department of Pennsylvania, Grand Army of the Republic in 1883; was a delegate from the 12th Congressional District to the Republican National Convention at Chicago in 1888, and was elected to Congress in 1885.

OSCAR II., FREDERIC, King of Sweden and Norway, born at Stockholm in 1829. After his education and foreign travels were completed, he succeeded to the throne in 1872. He re-organized the army and the railroads. In 1873 he visited Norwegian Lapland, and in 1875 the emperors of Germany and Russia. King Oscar has fine literary taste. He has published translations of Göthe's *Faust* and *Tasso*, a sketch of Charles XII., and a volume of poems.

OSCEOLA, (*As-se-he-ho-lar*, "Black Drink"), a Seminole chief, born in Georgia in 1804, died Jan. 30, 1838. He was a son of an English trader, named Powell, and of a chief's daughter. With her he removed to Florida while a child and there attained great influence among the Indians. In 1835 his wife, the daughter of a runaway slave, was seized as a slave. The outraged husband threatened revenge, and for his threats was imprisoned six days in irons by General Thompson; six months afterward he killed the general and four others outside Fort King. This was the beginning of the second Seminole war. He then placed himself at the head of a band which had surprised and massacred Major Dade and a detachment of soldiers, and taking to the almost impenetrable Everglades with two or three hundred followers, he fought for nearly two years with great energy and skill the superior numbers sent against him. He was taken prisoner at last, in October, 1837, by General Jesup, while holding a conference under a flag of truce, and confined in Fort Moultrie until his death.

OSCEOLA, a village, the county seat of Clarke county, Iowa, about forty-five miles south of Des Moines. It contains a normal school and a high-school, and several mills.

OSCEOLA MILLS, a borough of Pennsylvania, on Mushannon Creek, about thirty miles north of Altoona. It contains numerous mills and a machine-shop, and is engaged in coal-mining.

OSCODA, a village of Michigan, seventy miles north of Bay City, at the mouth of Au Sable River, and close to Au Sable village. It contains several

saw-mills and planing-mills and has a large trade in lumber.

OSCOTT, a Roman Catholic college, near Birmingham, which claims to be the center of the Roman Catholic movement in England. The name is first met with towards the close of the 17th century as the seat of a Catholic mission, which continued to be served by different priests till in 1752 it was formed into a college for the education of both laymen and ecclesiastics, and called St. Mary's College. In 1835 the present buildings were erected, and in 1889 the establishment became purely ecclesiastical, no longer admitting lay students. It is now styled St. Mary's Seminary.

OSGOOD, FRANCES SARGENT, daughter of Joseph Locke, born at Boston, Mass., June 18, 1811, died at Hingham, Mass., May 12, 1850. In 1835 she married S. S. Osgood, a portrait-painter, resided in England in 1836-40, and while there published *The Casket of Fate* and *A Wreath of Wild Flowers from New England*. Returning to Boston in 1840, she soon afterward removed to New York, and subsequently published *Poetry of Flowers*, and *Flowers of Poetry*; *The Floral Offering*, and two volumes of poems. A complete edition of her poems was published in 1850.

O'SHAUGHNESSY, ARTHUR WILLIAM EDGAR, an English poet and naturalist, born in London, March 14, 1846, died Jan. 31, 1881. He was employed in the natural history division of the British Museum, and married a daughter of Dr. Westland Marston; she died in 1879. During his brief life he published *Epic of Women*; *The Lays of France*, and *Music and Moonlight*; and soon after his death appeared *Songs of a Worker*. As a poet he reveals imagination, passion, tenderness, melody, and a mastery of lyrical forms.

OSHKOSH, the county-seat of Winnebago county, Wis., on both sides of the Fox River, at its entrance to Lake Winnebago, eighty miles northwest of Milwaukee. Population in 1890, 22,752. See *Britannica*, Vol. XVIII, p. 55.

OSKALOOSA, the county-seat of Mahaska county, Iowa, 104 miles by rail northwest of Burlington. Population in 1890, 7,300. See *Britannica*, Vol. XVIII, p. 55.

OSMAN, NUBAR PASHA, a Turkish general, born at Tokat, in Asia Minor, in 1832. After his military education was finished, he entered the cavalry in 1854 and served under Omar Pasha. He took part in the suppression of the rebellions in Syria (1860), in Crete (1867), and the Yemca (1874). After the Russians had crossed the Danube in 1877, Osman Pasha defeated their ninth corps near Plevna, and then thoroughly fortified that city. On Sept. 14th he repulsed the Russian besiegers with a loss of 2,000 men. On Dec. 10th he made a gallant but unsuccessful attempt to break through the Russian lines. Being wounded he was compelled to capitulate, surrendering 40,000 men and 400 cannon. His skillful conduct of the siege had given him fame as an engineer and commander. After the war the re-organization of the Turkish army was intrusted to him. He became commander-in-chief of the imperial guard (1878), governor-general of Crete, and minister of war in 1878. In 1882 he retired to private life.

OSMOSE, the inter-diffusion of two liquids through a septum, usually of bladder or of parchment paper. If a bottle, filled with one liquid, be closed by parchment paper, and be completely immersed in a vessel containing another liquid, increase or decrease of the contents of the bottle will occur according as the liquid contained in the bottle passes out through the septum less quickly or more quickly than the other liquid passes in-

wards. When the contents are increased the phenomenon has been called *endosmose*; when they decrease it has been termed *exosmose*. The distinction is obviously not a scientific one; for a reversal of the positions of the liquids will cause a reversal of the osmotic process, so that the process which was formerly denominated *exosmose* must now be called *endosmose*, and *vice versa*. The phenomenon is one of extreme importance, for it is constantly taking place in living bodies—both animal and vegetable.

OSNABURG, a village of Ohio, four miles east of Canton. It has abundant deposits of limestone, iron, and coal.

OSSORY, a diocese of the Roman Catholic church of Ireland, embracing the county of Kilkenny and parts of King's and Queen's counties. The bishop has his cathedral at Kilkenny. There is an Ossory parliamentary division in Queen's county.

OSTEOLEPIS, a genus of fossil ganoid fish peculiar to the Old Red Sandstone. It is characterized by smooth rhomboidal scales, by numerous sharply-pointed teeth, and by having the two dorsal and anal fins alternating with each other. The body is long and slender.

OSTERODE, a town of Hanover, at the western base of the Harz Mountains, on the Söse, an affluent of the Leine, thirty miles northwest of Nordhausen. Its church of St. Giles contains the graves of the dukes of Grubenhagen, and there are also a fine town-hall, baths, large grain-stores, and cotton, woolen and linen factories. Population, 6,435.

OSTUNI, a city of South Italy, twenty-two miles northwest of Brindisi. Population, 15,199.

OSWALD, FELIX LEOPOLD, a Belgian-American writer, born in 1845, and educated as a physician, but soon turned his attention to natural history. In pursuit of his favorite studies he has traveled extensively, and has been a frequent contributor to scientific and popular magazines. He is the author of *Summerland Sketches*, or *Rambles in Backwoods of Mexico and Central America* (1880); *Zoological Sketches* (1882); *Physical Education* (1882), and *Household Remedies* (1886).

OSWEGO, a city, the county-seat of Labette county, Kan., on the Neosho River, ten miles north of Chetopa. It has an excellent water-power and a number of mills and factories. Population in 1890, 2,522.

OSWEGO, a port of entry and county-seat of Oswego county, N. Y., situated at the mouth of Oswego River, on Lake Ontario, at the extremity of Oswego Canal. Population in 1890, 21,826. See *Britannica*, Vol. XVIII, p. 64.

OSWEGO FALLS, a village of New York, on Oswego River, opposite Fulton. It contains numerous mills and factories.

OSWEGO TEA, a name given to several species of *Monarda*, natives of North America, because of the occasional use of an infusion of the dried leaves as a beverage. They belong to the natural order *Labiata*, somewhat resembling mints in appearance, and have an agreeable odor. The infusion is said to be useful in intermittents and as a stomachic.

OSYMANDYAS, the name of a great king of Egypt, mentioned by Diodorus and Strabo, who reigned, according to these authors, as the 27th successor of Sesostris. He is said to have distinguished himself by his victories, to have invaded Asia with an army of 400,000 men and 20,000 cavalry, and to have conquered the Bactrians, who had been rendered tributary to Egypt by Sesostris. In honor of this exploit he is said by Hecateus to have erected a monument which was at once a palace and a tomb, and which, under the name of *Osyman-*

deion, was renowned for its size and splendor in later times. The Osymandeion is generally believed to be represented by the extant ruins of the Ramessesum at Medinet Habu though great difficulty has been felt in reconciling the descriptions of its magnificence in ancient writers with the dimensions of the existing relic. Nor can the name of Osymandias be recognized amongst the Egyptian kings.

OTCHAKOFF, a seaport of Russia, on the north shore of the estuary of the Dnieper, thirty-eight miles northeast of Odessa. It occupies the site of the ancient *Alector*, and has beside it the ruins of the once important Greek colony of Olbia. In 1492 the khan of the Crimea built here a strong fortress, which was taken by the Russians under Münnich in 1737, recovered in 1738, and again captured after a long siege by Potemkin in 1738, and definitively annexed by Russia. After it had been bombarded by the Allied fleet in 1855 the Russians demolished the fortifications. In 1887 a ship-canal was opened here, which makes the estuary of the Bug and Dnieper much more easily accessible to large ships. Population, 6,977.

OTIS, HARRISON GRAY, born in Boston, Oct. 8, 1765, died there Oct. 28, 1848. He graduated at Harvard in 1783, was admitted to the bar in 1786, and soon attained distinction in his profession. In 1796 he was chosen to the State legislature, and was a Federalist leader in Congress from 1797 to 1801. He was United States District Attorney, Boston, 1801; speaker in the Massachusetts legislature 1803-05; president of the State senate in 1805-11; judge of common pleas 1814-18; was in the United States Senate 1817-22; and was mayor of Boston, Mass., 1829-32.

OTSEGO, a village of Michigan, on the Kalamazoo River, ten miles southeast of Allegan. It has a number of mills and factories.

OTTAWA, one of the largest rivers of British North America. It rises nearly 300 miles due north of Ottawa City, flows west to Lake Temiscamingue, some 300 miles, and thence 400 miles southeast, and falls into the St. Lawrence by two mouths, which form the island of Montreal. Its drainage basin has an area variously estimated at from 60,000 to 80,000 square miles. During its course it sometimes contracts to 40 or 50 yards; elsewhere it widens into numerous lakes of considerable size. It is fed by many important tributaries.

OTTAWA, a city of Canada, the capital of the Dominion, and the county-seat of Carleton county. See Britannica, Vol. XVIII, p. 68.

OTTAWA, a city, the county-seat of La Salle county, Ill. Population in 1890, 9,971. See Britannica, Vol. XVIII, p. 69.

OTTAWA, a city, the county-seat of Franklin county, Kan., on the Osage River, twenty-seven miles south of Lawrence. It is the seat of Ottawa University and other educational institutions, and contains numerous mills and factories. Population in 1890, 6,271.

OTTAWA, a village of Ohio, on the Auglaize River, twenty miles north of Lima. It has manufacturing of spokes, hubs, sash and blinds.

OTTER, an aquatic canivore in the family *Mustelidae*, which also includes the badgers and weasels. See Britannica, Vol. XVIII, p. 69. The most common otter of North America is *Lutra canadensis*, which is much larger than European species, and ranges throughout the continent, though it is rare in settled districts.

OTTERBEIN, PHILIP WILLIAM, a German clergyman, born at Dillenburg, Germany, in 1726, died at Baltimore, Md., in 1813. He was a minister of the Reformed church in Germany, but in 1752 followed the call of Rev. Michael Schlatter to become a preacher

among the German settlers of Pennsylvania. He had an ardent missionary spirit, and was a powerful orator. He made extensive tours; joined with preachers of other denominations in holding revival meetings, prayer meetings, and open-air meetings in groves. He encouraged eloquent laymen to pray and exhort, some of whom became regular preachers afterwards. First he had charge of a church at Lancaster, Pa. In 1758 he removed to Tulpehocken, Pa.; in 1760 he went to Frederick, Md., and in 1765 he settled at York, Pa. In all his pastorates his novel methods excited antagonism. In 1774 he founded the Church of United Brethren in Christ at Baltimore, Md. Yet, strange as it may appear, he never left the communion of the German Reformed Church, and continued to do revival work among all other religious bodies. Shortly before his death he ordained Martin Böhm as preacher and superintendent of the new sect.

OTTERY ST. MARY, a town of England, on the river Otter, 11 miles east of Exeter. Twice the scene of a great conflagration, in 1767 and 1866, it retains its magnificent collegiate church, a reduced copy of the cathedral of Exeter, with the only other transeptal towers in England. Begun about 1260 by Bishop Brouncombe, it is Early English, Decorated and Perpendicular in style, and was restored by Butterfield in 1849-50. The old King's Grammar-school was demolished in 1854. Alexander Barclay was a priest here; Coleridge was a native; and "Clavering" in *Pendennis* is Ottery St. Mary, the Devonshire residence of Thackeray's stepfather. The town has manufactures of silk, shoe-laces, handkerchiefs and Honiton lace. Population, 2,924.

OTTUMWA, the county-seat of Wapello county, Iowa, on both sides of the Des Moines River, 75 miles west of Burlington, in the heart of the State's bituminous coal fields. Population in 1890, 13,996. See Britannica, Vol. XVIII, p. 70.

OUABAIN, a crystalline glucoside separated from the wood and roots of *Carissa shimperti*, a plant growing on the east coast of Africa. It is intensely poisonous, a twelfth of a grain being sufficient to kill a rabbit. It acts upon the heart in the same way that digitalis does, and has been employed in medicine as a substitute for digitalis, and also to lessen the violence of the paroxysms in whooping-cough. The Somalis make an extract of the wood and roots for an arrow poison.

OUBLIETTE (Fr. "place of forgetfulness"), a dungeon in which persons condemned to perpetual imprisonment were confined—especially a perfectly dark underground dungeon—into which the prisoners were let down from above by ropes.

OUIDA, the pseudonym of the novelist LOUISE DE LA RAMÉ, who was born about 1840, and who spent part of her girlhood with her mother at Bury St. Edmunds. About 1874 she was living in London at the Langham, and since then Florence has been her chief abode. She was writing for "Colburn's New Monthly" and "Bentley's Magazine" as early as 1861; and among more than a score of novels by her may be mentioned *Under Two Flags*, the best, and *Guilderoy* published in 1889. Muscular heathenry, nature-worship, and an encyclopædia ignorance are the prevailing notes of these books, which remind one of the scene-painting, very clever, but wholly unreal. One wearies of their brown harlots and blasé aristocrats; one ceases even to be even amused with their classical and cosmopolitan malapropisms.

OULESS, WALTER WILLIAM, portrait painter, born at St. Helier's, Jersey, Sept. 21, 1848, and educated at Victoria College, Jersey. He began to study art in London in 1864; four years later first

exhibited at the academy; and became an A.R.A. 1877, an R.A. in 1881. Of his portraits, perhaps that of Darwin is most generally known, on account of the very fine etching from it by Rajon. His portraits of Justice Manisty and Cardinal Newman are fine examples of his different methods.

OUNCE (Lat. *uncia*), the twelfth part of the *as* or *libra* (pound), or indeed the twelfth part of any magnitude, whether of length, surface, or capacity. Hence *inch*, the twelfth part of a foot. In troy weight the ounce is divided into 480 grains, and 12 ounces make a pound; the ounce in avoirdupois weight contains $437\frac{1}{2}$ grains troy, and 16 of them go to the pound.

OURAY, a town, the county-seat of Ouray county, Colo. It has valuable deposits of silver, and contains a smelting furnace and saw-mills.

OUSELEY, SIR FREDERICK ARTHUR GORE (1825-1889), an English divine and musician, born Aug. 12, 1825, and at nineteen succeeded his father, Sir Gore Ouseley (1770-1844), the celebrated Orientalist and first baronet. He graduated at Christ Church, Oxford, and took orders, his first curacy being at St. Paul's, Knightsbridge. In 1855 he followed Henry Bishop as professor of Music at Oxford, and in 1856 became vicar of St. Michael's, Tenbury. He had an immense knowledge of music, extending from St. Ambrose to Wagner. His mastery of the literature of music is seen in his edition of Neumann's *History of Music*, and his treatises on harmony have taken their place as standard works. He was an accomplished linguist, and collected a magnificent library. His oratorios, *St. Polycarp* and *Hagar*, are too solid and severe to be popular, but will always command respect. Havergal's *Memoirs of F. A. G. Ouseley*, published after his death in 1889, is a collection of contemporary opinions pronouncing him a perfect gentleman, a skilled musician, and a churchman who devoted the whole of his fortune to building and endowing St. Michael's College, Tenbury, for the training and education of choristers.

OUTHWAITE, JOSEPH H., born in Cleveland, Ohio, Dec. 5, 1841; was educated in the public schools of Zanesville, Ohio, taught two years in the high-school of that city, and was principal of a grammar school in Columbus, Ohio, three years; read law while teaching, and was admitted to the bar in 1866; practiced law from 1867 to 1871 at Osceola, Missouri; was elected prosecuting attorney of Franklin county, Ohio, in 1874, and again in 1876; was appointed one of the trustees of the County Children's Home from March, 1879, until July, 1883, and one of the trustees of the Sinking Fund of the city of Columbus in 1883, and re-appointed in 1884 for a term of five years; and was elected to Congress in 1885.

OVAMPOS, or **OVAMBO**, also called **OTJHERERO**, an industrious and peaceable Bantu people of the west coast of Africa, inhabiting the country south of the Cunene. Ovampoland is accordingly in the German Protectorate, and extends from Damara-land northward to the Portuguese frontier. Some 50 miles from the coast the country rises into a lofty tableland, which is moderately fertile, then declines to the south and east into the deserts of the Kalihari and the region of Lake Ngami. Many strong indications of copper ore are found in various places. Ivory is still traded in.

OVARY: in botany, the part of the pistil containing the ovule.

OVEN-BIRD, a genus and sub-family of Passerine birds, family *Dendrocolaptidae*. The name is given because some of the species build nests resembling an oven or beehive. The genus, which consists of nine species, is exclusively South Ameri-

can, ranging from Guiana and Ecuador to La Plata. The habits of the birds have been described chiefly by Mr. Edward Bartlett, and by Darwin in his *Voyage of the Beagle*. The name oven-bird is also applied, for a similar reason, to the willow-wren.

OVERLAP: in geology. When the upper beds of a conformable series of strata extend beyond the bottom-beds of the same series, the former are said to overlap the latter. Hence the strata showing this structure constitutes an *overlap*.

OVERSTONE, SAMUEL JONES LOYD, BARON, (1796-1863), an English economist and financier. On leaving Cambridge Loyd entered his father's banking-house. He entered parliament in 1819 and in 1850 was raised to the peerage. The first of Lord Overstone's famous tracts on the Bank of England and the state of the currency was published in 1837, and was followed by others between that period and 1857. The proposal for making a complete separation between the banking and issue departments of the Bank of England, introduced by Peel into the Act of 1844, was first brought forward in these tracts.

OVID, a village of Michigan, on Maple River, ten miles east of St. John. It contains several mills, machine-shops and factories.

OVID, a village, the county seat of Seneca county, N. Y., situated on a ridge between Seneca and Cayuga Lakes, about forty miles north of Elmira. It is the center of a thriving local trade. Near here is the Willard Lunatic Asylum.

OVIPAROUS, a term applied to the great majority of female animals, whose eggs are first laid and then hatched. *Ovoviviparous* is a corresponding term applied to animals in which the eggs are hatched within the body of the mother, and where there is no nutritive connection between parent and offspring. Some reptiles, amphibians, fishes, etc., which do not lay their eggs illustrate this mode of parturition.

OWATONNA, a city the county-seat of Steele county, Minn., on Straight River, fifteen miles south of Faribault. It is the seat of the State school for dependent children, contains a valuable mineral spring, and has important manufactures and a good shipping trade. Population in 1890, 3,845.

OWEGO, the county-seat of Tioga county, N. Y., on the Susquehanna River at the mouth of Owego Creek, 228 miles northwest of New York City. Population in 1890, 8,930. See *Britannica*, Vol. XVIII, p. 85.

OWEN, DAVID DALE, geologist, born in Lanarkshire, Scotland, in 1807, died at New Harmony, Ind., in 1860. In 1825 he settled with his father, Robert Owen, at New Harmony, Ind., but subsequently he went to Germany to study geology and natural history. Returned to Indiana in 1833, and the legislature of that State employed him to make a geological survey of Indiana, the results of which are given in his *Report of a Geological Reconnaissance in 1837* (Indianapolis 1838). In 1839, the United States Government appointed him to make geological surveys of Iowa, Wisconsin and Minnesota. The results were published in 1852. The published reports contained numerous plates, notably several on gigantic mammoth remains. He was successively State geologist of Arkansas and Indiana. Dr. Owen's extensive scientific knowledge was of great benefit in accomplishing his geological work, for as a chemist he made analysis of minerals and waters that are included in his reports; as a naturalist he described fossils new to science; and as an artist he made sketches of scenery, diagrams, sections of rock, strata, and maps which accompanied his reports.

OWEN, JOHN JASON, an American educator, born at Colebrook, Conn., in 1803, died at New York City in 1869. After studying theology at Andover Theological Seminary, he became principal of the Cornelius Institute, New York, in 1836. In 1848 he was made professor of the Greek and Latin languages in the New York Free Academy. Afterwards he was vice-president of this institute. The Free Academy had its name changed to that of the College of the City of New York, while Owen was its vice-president. Owen's publications were editions of Xenophon's *Anabasis* and *Cyropædia*; Homer's *Odyssey* and *Iliad*; and a *Commentary on the Gospels and the Acts* (1857-69). He was an able scholar, faithful teacher and learned commutator.

OWEN, ROBERT DALE, author, born at Glasgow, Scotland in 1800; died at his summer residence at Lake George, N. Y., in 1877. He was educated at Fellenberg's school, at Hofwyl, Switzerland, and in 1825 settled with his father, Robert Owen, at New Harmony, Ind. In 1828 he established in New York a weekly paper, "The Free Inquirer," which was devoted to socialistic principles. In 1832 he returned to New Harmony. While a member of the Indiana legislature from 1835-8, he did much to promote the common schools of that State. In 1843 he was elected to Congress, in which he served two terms. He took an active part in organizing the Smithsonian Institution. He was afterwards appointed one of the regents of this institution, and served also as chairman of its building committee. From 1853-8 he was at Naples, at first as United States *charge d'affaires*, and afterwards as United States Minister. His later years were devoted to the propagation of spiritualism. Owen's principal writings are *Footfalls on the Boundary of Another World* (1860); *The Debatable Land Between this World and the Next* (1872); and *Threading My Way* (1874); an autobiography.

OWEN, SIR PHILIP CUNLIFFE, a British promoter of industrial art, born in 1828. In 1860 he was made assistant director of the South Kensington Museum, and in 1873 he succeeded Sir Henry Cole as director. In 1876 he was executive commissioner at the Centennial exhibition at Philadelphia, and in 1878 he served as secretary of the royal commission for the Paris exposition. He took an active part in the International Fisheries exhibition at London in 1883, the Health and Education exhibitions in 1884, the Music exhibition in 1885, and the Colonial and Indian exhibition in 1887. In all these cases he displayed great executive ability, and promoted the objects of the industrial arts materially. In 1873 he was knighted. He received various other marks of appreciation from his government.

OWEN, SIR RICHARD, an English anatomist and zoölogist, born at Lancaster in 1804. He became assistant curator of the Hunterian Museum; in 1834 he was appointed professor of comparative anatomy at St. Bartholomew's Hospital; Hunterian professor in the same subject at the Royal College of Surgeons in 1836; superintendent of the natural history department in the British Museum in 1856. In 1839, from the examination of a fossil bone sent to him from New Zealand, he propounded a theory of the existence, in remote ages, of a bird more gigantic than the ostrich; and the accuracy of his theory was subsequently established by the discovery of the whole fossil. This led him to the adoption of his famous theory of the extinction of species. He is a voluminous writer on the subject to which his scientific researches have been devoted.

OWEN, WILLIAM D., born at Bloomington, Ind., Sept. 6, 1846. He was educated at the Indiana State University and afterwards studied law, but never

engaged in the practice; served in the ministry of the Christian church from 1868-78; was associate editor of the "Western Journal;" is the author of *Success* and of the *Genius of Industry*; was presidential elector in 1880, and was elected to Congress in 1885.

OWENS, JAMES W., born in Springfield township, Franklin county, Ind., Oct. 24, 1837. He entered Miami University, at Oxford, Ohio, in 1859, and graduated in 1862; is a lawyer by profession; enlisted in the army as a private soldier in the 20th Ohio Volunteer infantry, and served during the first three months' service; re-enlisted at the end of the three months' service, and was made first lieutenant of Company A, 86th Ohio Volunteer infantry, and on the re-organization of that regiment was made captain of Company K; attended law school at Ann Arbor, Mich.; was elected prosecuting attorney of Licking county, Ohio, in 1867, and re-elected in 1869; was elected to the Ohio senate in 1875, and re-elected in 1877, and was elected president of the senate; is a member of the board of trustees of Miami University, and was elected to Congress in 1889.

OWENSBORO, the county-seat of Daviess county, Ky., on the Ohio; 160 miles below Louisville. Population in 1890, 9,818. See *Britannica*, Vol. XVIII, p. 88.

OWEN SOUND, a town and port of entry of Ontario, at the head of Georgian Bay, 122 miles northwest of Toronto. It possesses a deep sheltered harbor, and has a large trade in lumber and grain, besides manufactories of furniture and wooden wares, machinery and woollen goods. The Canadian Pacific steamers leave here for Port Arthur. Population, 6,000.

OWL, see *Britannica*, Vol. XVIII, pp. 88-91.

OWOSSO, or OWASSO, a city of Michigan, on the Shiawassee River, seventy-eight miles northwest of Detroit. The river supplies abundant water-power, and the city has flour and planing-mills, and furniture and sash and blind factories, besides foundries and railway shops. Population in 1890, 6,544.

OXALIDEÆ, a natural order of exogenous plants, allied to *Geraniaceæ*; including herbaceous plants, shrubs, and trees; with generally compound alternate leaves; calyx of five equal persistent sepals; corolla of five equal unguiculate petals, spirally twisted in bud; ten stamens; the ovary, five-celled, with five styles; the fruit a capsule of five cells opening by five valves, or more rarely a berry with five one or many-seeded cells. Temperate North America and the Cape of Good Hope may be said to be the headquarters of the order. The herbaceous parts of almost all the species are distinguished by a strong acidity, which is owing to the presence of oxalate of potash; some, however, are bitter and slightly stimulating. The fruit of some is pleasantly acid and cooling—as *Carambola*—and reputed to be antiscorbutic and antiseptic.

OXALURIA, the occurrence of crystals of oxalate of lime in the urine.

OXENFORD, JOHN, dramatist and critic; born in Camberwell, England, in 1812, died Feb. 21, 1877. He was originally educated for the bar, but early turned to a life of letters, made himself familiar with French, German, and Spanish literature, and soon made his name known by admirable translations of such books as Goethe's *Dichtung und Wahrheit* and Eckermann's *Conversations with Goethe*. For his last thirty years he was dramatic critic for the London "Times," and his criticisms were ever characteristic of the genial kindness of his nature. He was a fluent and graceful writer, yet his original work suggested rather than demonstrated his

powers as a critic. His *Illustrated Book of French Songs* showed a dexterous mastery of the lighter forms of verse. He wrote many plays, among them the *Dice of Death*; the *Reigning Favorite*; the *Two Orphans*; as well as the libretto for *The Lily of Killarney*, and one farce at least, *Twice Killed*, that became widely popular.

OXFORD, a village of Alabama, twenty miles northeast of Talladege. It is the seat of Oxford College, and an important shipping point for cotton.

OXFORD, a village of Georgia, about forty miles east of Atlanta. It contains the Palmer Institute, and is the seat of Emory College.

OXFORD, a village of Indiana, about twenty-two miles west of Lafayette. It contains an academy, and is the center of a good local trade.

OXFORD, a village of Iowa, fifteen miles west of Iowa City, near the Iowa River. It contains an academy, and is a thriving trade center.

OXFORD, a village of Maryland, one mile north of Baltimore. It contains many handsome suburban residences.

OXFORD, a village of Maryland, and a popular summer resort, situated on the eastern shore of Chesapeake Bay, on a navigable arm known as Three Haven River, ten miles southwest of Easton.

OXFORD, a village of Massachusetts, on French River, ten miles south of Worcester. It contains many mills and extensive boot and shoe factories.

OXFORD, a village, the county seat of Lafayette county, Miss., about thirty miles south of Holly Springs. It is the seat of the University of Mississippi, the Oxford Academy, the Oxford Institute, and the Union Female College.

OXFORD, a village of New York, beautifully situated in the fertile valley of the Shenango River, eight miles south of Norwich. It contains an academy, many mills and a tool factory.

OXFORD, a village, county seat of Granville county, N. C., about forty-five miles north of Raleigh. It contains an orphan asylum, and is extensively engaged in the tobacco trade.

OXFORD, a village of Ohio, forty miles northwest of Cincinnati. It contains important manufacturing of agricultural implements. The Oxford Female Seminary, the Western Female Seminary, and Miami University are located here.

OXFORD, a borough of Pennsylvania, about thirty miles west of Wilmington, Del. It contains extensive car-works and various other manufacturing, and is the seat of Lincoln University.

OXFORD CLAY, the principal member of the Middle Oolite series.

OXFORD FURNACE, a village of New Jersey, fifteen miles northeast of Phillipsburg. It contains many extensive foundries, furnaces, factories, machine-shops and mills.

OXYCHLORIDES, chemical compounds containing both chlorine and oxygen in combination with some other element, and intermediate in composition between the oxides on the one hand and the chlorides on the other. Thus, antimonious oxy-chloride is intermediate between antimonious oxide and antimonious chloride.

OYSTER. See Britannica, Vol. XVIII, pp. 106-110. The oyster fishery is by far the most important of the fishing industries of this country. The American oyster (*Ostrea Virginiana*) is found along the Atlantic coast from Florida to the Gulf of St. Lawrence. In some portions of this range it occurs in natural beds of large extent, that of Long Island Sound being 115 miles in length. Chesapeake Bay, with its many inlets and river mouths, is the best adapted home for the American oyster. It attains

here its highest excellence. The bottom of this bay is almost covered with beds of the finest oysters in the world. Baltimore is the most important mart in the oyster trade. It cans and pickles vast quantities of oysters for shipment to the west and to foreign countries. Farther south the coast oysters occur plentifully, but are only gathered for local use. On the coast of Georgia they occur in some places in such abundance as to form natural breakwaters firm enough to resist the billows of the ocean. The coast region here is made up of salt marshes from 12 to 18 miles wide through which slow-flowing rivers make their way to the sea. These rivers flow between banks of living oysters, so closely compacted, that a vessel might in some places, obtain a cargo in a space only three or four times its own length. Oysters abound also in the inlets and small bays of the Gulf of Mexico. In the Bay of Mobile they are plentiful and of excellent quality, and are cultivated on a large scale. In Louisiana are beds of oysters unsurpassed in size and flavor. On the Pacific coast oysters exist abundantly in the Strait of Fuca and in Puget Sound. These oysters are, however, quite small, but of fine flavor. The eastern oyster has lately been introduced on the Pacific coast and seems to be susceptible of easy cultivation there. In like manner oysters of the Chesapeake are brought to the Long Island and planted there to supply the beds that have become exhausted by over-dredging.

Oysters are said to be fatter in winter than in summer. What we call "fat" in the oyster is, however, no fat at all but a deposit of protoplasm, which forms a very digestible and highly nutritious food for man. It is laid down in the mantle or fleshy portion of the animal during the winter season, and again exhausted during the reproductive period in summer, when the oyster becomes poor and non-nutritious. The so-called "fattening" by removing the oysters for a few days to water fresher than that in which they grew is a dealer's trick. The oyster absorbs more fresh water than sea-water. By this means it becomes plumper, and at the same time loses part of its saltiness. Some dealers even warm the water by means of steam, in order to induce the oyster to take in more water and thereby become plumper.

The principal food of the oyster consists of microscopic beings and fragments of organic matter, which are carried by the currents of water to the mouth of the animal at the hinge end of the shell. When this material is examined through the microscope, it is seen that the animal subsists largely upon what scientists call "diatoms"—one of the lowest types of moving plants which swim in the water, encased in minute sandstone cases or boxes of delicate workmanship. When these have been found in the intestines of the oyster, they have usually had their living contents already dissolved out by the action of the gastric juice.

Some American oyster-lovers reject green oysters under the impression that they are poisonous or at least unhealthy. In France and England green oysters are looked upon as a special delicacy. They bring higher prices than the ordinary varieties. Investigation has demonstrated that their green color is due to the eating of green vegetable food, as the young grass growing on the bottom of shallow oyster beds. The chlorophyll of the green food is absorbed in such quantities as to tint the blood-cells of the animals greenish. Green oysters are, in reality, more palatable and nutritious than white ones.

As to the statistics of the oyster fishery in the United States we take from the census report of

1880 (the report of 1890 not being published yet) the data in table below.

The total value of sales includes for Maine \$37,500, and for Pennsylvania \$187,500, Philadelphia being an important seat of the oyster trade.

To compare the American production and consumption of oysters with those of Great Britain and France we append here a small table taken from Mulhall's Dictionary of Statistics of 1886. The left-hand column gives the production of oysters by millions, and the right-hand table gives the yearly consumption by millions:

	Production. Millions.	Consumption, Per Millions.	Per Inhab.
U. Kingdom.....	300	London.....	220
France.....	330	Paris.....	57
United States.....	11,200	New York.....	810
Portugal.....	600	France.....	260
Total.....	12,450		7

Baltimore packs seven million bushels per annum. An oyster three months old is the size of a shilling, six months half-a-crown, but is not fit to eat before four years old. The oyster beds established by advice of Abbé Bonnetard in France produced 97 million oysters in 1831.

OYSTER INDUSTRY OF THE UNITED STATES, ACCORDING TO CENSUS REPORT OF 1880.

States.	Persons Employed.	Capital Invested.	Bushels Produced.	Value to Producer.	Value of Sales.
New Hampshire.....	9	\$ 2,400	1,000	\$ 800	\$ 6,050
Massachusetts.....	896	303,175	26,000	41,800	405,550
Rhode Island.....	650	110,000	163,200	225,500	356,925
Connecticut.....	1,006	316,200	336,450	386,625	672,875
New York.....	2,734	1,013,000	1,043,300	1,043,300	1,577,050
New Jersey.....	2,917	1,057,000	1,975,000	1,970,000	2,080,625
Delaware.....	1,065	145,000	800,000	325,000	687,725
Maryland.....	23,402	6,034,350	10,600,000	2,650,000	4,730,475
Virginia.....	16,315	1,351,100	6,887,320	1,948,625	2,218,375
North Carolina.....	1,020	68,500	170,000	60,000	60,000
South Carolina.....	185	12,250	50,000	20,000	20,000
Georgia.....	850	18,500	70,000	35,000	35,000
Florida.....	166	22,000	78,600	15,950	15,950
Alabama.....	300	16,000	104,500	44,950	44,950
Mississippi.....	60	3,000	25,000	10,000	10,000
Louisiana.....	1,400	36,750	295,000	200,000	200,000
Texas.....	240	17,750	95,000	47,300	47,300
Washington Territory.....	85	6,550	15,000	10,000	45,000
Total.....	52,805	\$10,588,295	\$22,195,370	\$9,034,861	\$13,438,852

P

PABNA—PAEZ

PABNA, a town of Bengal, India, on an arm of the Ganges, 115 miles north of Calcutta. Population, 15,267. The district has an area of 1,847 square miles and a population of 1,311,728.

PACA, a remarkable genus of rodents, allied to the Agoutis, represented by a single species, which ranges in Central and South America from Guatemala to Paraguay, east of the Andes. Its cheekbones are uniquely developed, the zygomatic arch being enlarged to form a great cavity on each side. Each communicates by a narrow aperture with the mouth, is lined by mucous membrane, and does not contain food as an ordinary cheek-pouch naturally does. Their function, if they have any, is unknown. The paca is large for a rodent, being about two feet in length. It is stout, and somewhat pig-like in build, with a large blunt head, cloven lip, small ears, stump-like tail, thick legs, five-toed feet and rounded back. The color is brownish yellow above, whitish below, with whitish yellow spots or longitudinal bands along the sides. Though somewhat clumsy in form and gait, the paca runs actively, and can swim well. It lives alone or in pairs in the moist forests, especially by sides of rivers, and tends to be nocturnal in its habits. It makes burrows, which are said to have three openings. The female bears only one or two young at a birth. As a vegetable eater, the paca sometimes does damage to sugar-cane plantations and gardens. Its fat, pork-like flesh is much esteemed.

PACHACAMAC, a village of Peru, eighteen miles southwest of Lima, with the ruins of a temple from which Pizarro took immense treasure.

PACHMARHI, a sanitarium and convalescent dépôt for European troops in India, situated 2,500 feet above the plains, in the Central Provinces, 110 miles southwest of Jabalpur.

PACIFIC, a village of Missouri, on the Maromee River. It has rich beds of white sand, fire-clay, and deposits of iron, copper and lead.

PACKARD, ALPHEUS SPRING, born in Chelmsford, Mass., in December, 1798; died in Maine, July, 13, 1884. He graduated at Bowdoin in 1816, and for nearly sixty-five years held various professional appointments in that institution, of which he was finally made acting president. He acted as chaplain for many years and contributed extensively to scientific publications.

PACKARD, ALPHEUS, JR., son of the foregoing, born in Maine, February 19, 1839; graduated at Bowdoin in 1861, served as an army surgeon 1864-'65, and became director of the Peabody Museum at Salem, Mass. In 1878 he was appointed professor of zoölogy and geology at Brown University. He was a member of the United States Entomological Commission and has written largely on insects.

PACKER, ASA, born in Groton, Conn., December 20, 1806; died in Philadelphia, Pa., May 17, 1879. He acquired an interest in boating coal to Philadelphia; in 1831 he established a store and boatyard, and entered on various extensive schemes of mining and transportation that were highly remunerative. Later he became county judge, and eventually, from the profits of his many successful ventures, rose to be the wealthiest person in Pennsylvania. From 1853 until 1857 he was a Democratic Member of Congress. In 1865 Mr. Packer gave \$500,000 and 115 acres of land for the erection

of Lehigh University at Bethlehem, Pa., and in his will increased the endowment to \$1,500,000, with \$500,000 additional for a library.

PADDOCK, ALGERNON S., born in Glens Falls, N. Y., November 9, 1830; studied law and removed to Nebraska, where he became secretary of the Territory. From 1875 to 1881 he served as United States Senator; was defeated for reelection, but in January, 1887, was again elected for the term ending March 3, 1893.

PADDOCK, BENJAMIN HENRY, born in Norwich, Conn., February 28, 1828; was ordained in the Protestant Episcopal Church in 1853, and held pastorates in New York, Maine, and Detroit. In 1878 he was elected bishop of Massachusetts, and died March 9, 1891.

PADDOCK, JOHN ADAMS, born in Norwich, Conn., January 19, 1825; was ordained in the Protestant Episcopal Church in 1850, and held pastorates in Stratford, Conn., and Brooklyn, N. Y., up to 1880, when he was elected missionary bishop of Washington Territory (now State).

PADEREWSKI, IGNACE JAN, one of the greatest pianists of the age, was born in Podolia, a province of Russian Poland, Nov. 6, 1860. He began to play on the piano at the age of three years. At the age of seven he was placed under the instruction of a master. In 1872 he went to Warsaw, where the foundation of his knowledge of harmony and counterpoint was laid by Rogerski. Later he pursued his musical studies under Kiel, the celebrated teacher of Berlin. His first musical tour was made through Russia, Siberia, and Roumania, and during that tour he played only his own compositions. At eighteen years of age he became professor of music in the conservatory of Warsaw. In 1884 he was promoted to a professorship in the conservatory of Strasburg; but in less than a year he determined to abandon teaching and enter upon the career of a piano virtuoso. After three more years of thorough study under the ablest masters, he began his professional tours, achieving notable success in all the chief cities of Europe. He married at the age of 19. Later his wife died, but a son survived her. He practices from six to eight hours daily. In the autumn of 1891 he came to New York, and began, at the age of 31, a tour of extraordinary success in the chief American cities.

PADUCAH, a city, the county-seat of McCracken county Ky., on the Ohio River, near the mouth of the Tennessee, about fifty miles above Cairo. Population in 1890, 13,076. See *Britannica*, Vol. XVIII, p. 132.

PAEZ, JOSÉ ANTONIO, born in Venezuela in 1790; died in New York city in May, 1878. After serving for many years in various capacities in the revolutionary movements of the early part of the century, Paez finally became head of the army with rank of general-in-chief. Such rank is risky among the South American republics, where a successful pronunciamento may in one day make a subaltern a major-general and send a commander-in-chief to the gallows. He underwent the usual vicissitudes of such warfare, and was sometimes in defeat or in prison, but more often in command. When, in 1825, his impeachment was proposed, the populace mutinied and he became the civil and military ruler of Venezuela. In November, 1829, the country proclaimed its absolute independence

of New Grenada, and Paez served as president of the new republic for several years. He acted later as minister to the United States, and from 1861 to 1863 was again chief executive. After his resignation he spent most of his time in the United States.

PAGE (derivation variously assigned to Gr. *pais*, "a boy," and Lat. *pagus*, "a village"), a youth of noble or good birth employed in the service of a royal or noble personage. The practice of employing youths of noble birth in personal attendance on the sovereign existed in early times among the Persians and Romans, and was a special feature of feudal chivalry in the Middle Ages. The degree of page was preparatory to the further degrees of esquire and knight. The practice of educating the higher nobility as pages at court began to decline after the 15th century. Pages still figure, however, on ceremonial occasions at the chief courts of Europe. The Corps of Pages at St. Petersburg is a cadet school for the Russian Guards.

PAGE, WILLIAM, portrait-painter, born at Albany, N. Y., in 1811, died at Tottenville, Staten Island, N. Y., in 1885. He studied painting under Samuel F. B. Morse and at the National Academy of Design. After that he studied theology at Andover and Amherst for two years. His faith being shaken he returned to painting again. Settling down in New York City he executed likenesses of William L. Marcy, John Quincy Adams and others. In 1836 he was elected a member of the Academy. From 1849 till 1860 he resided in Europe, chiefly at Florence and Rome. While in Europe he painted the portraits of Robert Browning and his wife, and those of many other well-known Englishmen and Americans, also his *Venus*, *Moses* and *Aaron on Mount Horeb*, *Infant Bacchus*, and *Flight into Egypt*. In his brilliant coloring Page has become the rival of Titian. After his return to New York he painted Lowell, President Eliot of Harvard, Henry Ward Beecher, Admiral Earragut, General Grant, and many more. From 1871 till 1875 he was president of the Academy of Design. In his old age his intellect became clouded. Page had been thrice married and twice divorced.

PAGET, SIR GEORGE EDWARD, K. C. B., born at Yarmouth, England, in 1809, and educated at the Charterhouse and at Cambridge. He took his B. A. degree in 1831, became Fellow of Caius in 1832, M. D. in 1838, D. C. L. Oxford and Durham, LL. D. Edinburgh, and F. R. S. in 1855. In 1872 he was appointed regius professor of physic in Cambridge, and became K. C. B. in 1885. Sir G. Paget may well be regarded as a public benefactor, as having taken the principal part in the great advance that has been made of late years in the education of medical practitioners.—His brother, SIR JAMES PAGET, Bart., was born at Yarmouth in 1814. He became member of the Royal College of Surgeons in 1836, Hon. Fellow in 1843, member of the council in 1865, president of the college in 1875, Bradshawe Lecturer in 1882, serjeant-surgeon to the queen, surgeon to the prince of Wales, and consulting surgeon to St. Bartholomew's Hospital. He was created baronet in 1871, and in the same year LL. D. of the university of Edinburgh. Two standard works are *Lectures on Surgical Pathology*, and *Clinical Lectures*. He is vice-chancellor of the University of London, and a member of the Institute of France (Academy of Sciences).

PAINE, ROBERT TREAT, an American lawyer, one of the signers of the Declaration of Independence, born in Boston, March 11, 1731, died in 1814.—His son, Thomas, (1773-1811), changed his name, to avoid confusion with the author of the *Age of Reason*,

son, to ROBERT TREAT PAINE, JR. He became a noted writer and was author of the song *Adams and Liberty*.

PAINESVILLE, a village, the county-seat of Lake county, Ohio, on Grand River near Lake Erie, about 30 miles east of Cleveland. It has many excellent educational institutions, a fine harbor, and numerous manufacturing industries.

PAINTING IN AMERICA: PORTRAIT PAINTING.

The earliest painter of American birth of whom we have record is Robert Feke. He painted portraits at Philadelphia about the middle of last century. Specimens of his work are in possession of Bowdoin College, the Redwood Athenæum, New Port, R. I., and the Rhode Island Historical Society. Next in date is Matthew Pratt (1734-1805). The portrait of Cadwallader Colden, which he painted for the New York chamber of commerce in 1772, attests his undoubted talent. But the most noted painters of the last half of the 18th century, were John Singleton, Copley and Benjamin West. Copley's (see *Britannica*, Vol. VI, p. 346) skill in portraiture is shown by numerous pictures in the Museum of Fine Arts, Boston; at Harvard University, and in many private collections. Of his numerous historical pictures, executed in England, the *Death of the Earl of Chatham*, has become most famous. West (see *Britannica*, Vol. XXIV, p. 505) produced a large number of historical and scriptural pictures of a high order, as the *Death of Wolfe*; the *Departure of Regulus*; *Death on the Pale Horse*, and *Christ Rejected*. When 65 years old he painted one of his largest works, *Christ Healing the Sick*, which on being exhibited at London drew immense crowds, and was purchased by the British Institution for 3,000 guineas.

The next period, that of the Revolution, produced two painters, whose names stand high in the list of American artists, Gilbert Stuart and John Trumbull. (For Stuart see *Britannica*, Vol. XXII, p. 611). Stuart studied for several years under Benjamin West in London. After he came back to America in 1793, he painted a large number of national portraits. The one of Washington, known as the *Athenæum Head*, is best known to the American public. Excellent specimens of his works are owned by the Museum of Fine Arts, Boston; the New York Historical Society, and other institutions. Stuart was a master in the rendering of the flesh tints, and was more successful in giving fine heads than fine figures and draperies. Trumbull (see *Britannica*, Vol. XXIII, p. 592) studied also under Benjamin West in London. He also produced a number of portraits, including several of George Washington. But his talents were most conspicuous in historical composition. His most notable works are *The Siege of Gibraltar*; *Declaration of Independence*; *Death of Montgomery*, and *Battle of Bunker Hill*. In 1817 he received a commission from Congress for four historical subjects: *Declaration of Independence*; *Surrender of Burgoyne*; *Surrender of Cornwallis*; and *Resignation of Washington*. Some of the best specimens of his skill may be seen at Yale College.

Among the less renowned American painters who flourished from 1780 to 1840 we mention Charles Wilson Peale, who painted several portraits of Washington; Joseph Wright, Edward Savage, William Dunlap (who published in 1834 a *History of the Arts of Design in the United States*); Col. Henry Sargent, John Neagle, who painted in 1825 a life-size picture of Patrick Lyon, the blacksmith; John Vanderlyn, best known by his *Marius among the Ruins of Carthage*, and *Ariadne*, which is classic in style. Washington Allston, a native of South Carolina, was sometimes called the "American Titian"

from his brilliant coloring (see ALLSTON in Vol. I, p. 85, of these Revisions and Additions).

Latter American portrait-painters were: Samuel L. Waldo, and William Jewett, who painted in partnership; William E. West, Charles C. Ingham, Henry Inman, George P. A. Healy, W. H. Furness, Thomas Le Clear, George A. Baker; Thomas P. Rossiter, Joseph Ames. Richard M. Staigg was noted for his miniatures, in which department Thomas Cummings also worked. Charles Loring Elliott was successful in the rendition of character, and William Page strove to imitate Titian in his coloring. Daniel Huntington, Thomas Hicks, and George H. Yewell have also produced notable works in portraiture.

More prominent are the American artists of the middle of the present century. Emmanuel Leutze, though of German birth, was brought here as an infant, and painted mostly American subjects, as *Washington Crossing the Delaware* and *Westward the Star of Empire takes its Way*, the last being in our national capitol. Edwin White painted some American historic pieces, notably *Washington Resigning His Commission*. Peter Rothermel has produced some works illustrative of American history, among which is the *Battle of Gettysburg*. William H. Powell is best known by his *De Soto Discovering the Mississippi*, in the capitol at Washington. Christian Schüssele, an Alsatian, was for some years director of the schools of the Pennsylvania Academy. His *Clear the Track, Men of Progress, The Iron Worker*, and *King Solomon* became widely known through the prints by John Sartain and other engravers.

GENRE PAINTING.—Among the American *genre* painters of the middle of this century the most important is William Sidney Mount. His works are thoroughly national in spirit. He delineated the humorous side of the life of the American farmer. The negro, too, figured frequently in his compositions. F. W. Edmonds produced also some clever *genre* pictures of American subjects, and Richard Caton Woodville, who studied at Düsseldorf, became well known through his *Mexican News; Sailor's Wedding*, etc., but was cut short in his career when only 30 years of age. Our Indians and trappers found delineators in George Catlin, Charles Deas, and William Ranney.

The best known American *genre* painters of later date are John B. Irving, who was noted for spirited execution and elaborate finish, Frank B. Mayer, John F. Weir, and Seymour J. Guy. The latter has given us some charming pictures of childhood. Two of our most successful *genre* artists are Thomas W. Wood and John G. Brown. The former depicts scenes of rural life and produces pictures with negro subjects. Mr. Brown is the painter of our news-boys and boot-blacks whom he often brings before us in characteristic positions. Many others might be mentioned in the department of figure-painting, notably B. F. Reinhart, J. W. Ehninger, Constant Mayer, E. Wood Perry, Edward H. May, Alfred C. Howland, etc.

Landscape Painting.—Of the many American landscape painters we mention especially Albert Bierstadt, Thomas Hill, and Thomas Moran. Bierstadt (see article in Vol. I, p. 281 of these Revisions and Additions) became famous by his paintings of *Rocky Mountain Scenery*, the *Yosemite Valley*, etc. Hill has produced some bold and effective paintings of *California Scenery* and the *Yellowstone*, and Moran made a fine painting of the *Grand Canon of the Yellowstone*, which is in the capitol of Washington. Moran's work shows him to be a careful student of nature, as well as a painter well

versed with the technique of his calling. Jervis McEntee, Homer D. Martin, George Inness and others, represent the "subjective style" of landscape painting, that is, they strive to reproduce for others such impressions as a scene called forth in their own minds when they contemplated it. Their pictures are not purely objective, that is, they do not reproduce all the details of a scene. They strive mainly for general impressions.

Marine Painting.—Of American marine painters we mention James Hamilton, a native of Ireland, who settled at Philadelphia, and who depicted the *Capture of the Serapis*; *Old Ironsides*; the *Ship of the Ancient Mariner*, and other weird and phantastic subjects. William Bradford, who painted effective pictures of Eastern coast scenery and icebergs, and Edward Moran, who successfully introduced the human figure into some of his marine pictures.

William T. Richards had his attention of late years directed to the painting of marine and coast views in water colors which show a very careful finish. Arthur Quartley, who was originally a sign-painter, succeeded in placing himself in a few years in the front rank of our marine painters. Alfred T. Briehar has produced some fresh and vigorous coast scenes; and Maurice F. H. de Haas, who was court-painter in Holland before he came to America in 1869, made a number of strong and brilliant compositions in the marine line.

Animal Painting.—In the line of animal-painting we find first John James Audubon, a native of Louisiana, as a scientific delineator and painter of birds (see *Britannica*, Vol. III, pp. 70-71). He ranks high as a painter and naturalist. Arthur F. Tait, an English artist in the animal line, who has settled in this country, is well known to the public, since many of his works have been lithographed and widely circulated. Walter M. Brackett and Gurdon Trumbull have made the painting of fishes a specialty. William H. Beard has gained a reputation through his pictures of bears and monkeys, in which the weaknesses and foibles of humanity are reflected with caustic satire. His brother, James H. Beard, has also won a good name as an animal painter, and so has his nephew, James Carter Beard. Peter Moran has been successful in painting sheep and cattle. So have James Hart, Thomas Robinson, George Inness, Jr., and J. Ogden Brown. Miss Fidelia Bridges painted charming pictures of bird-life; and R. M. Shurtleff introduced deer into his paintings of forest-sceneries.

Still-Life Painting.—In the department of still-life, Raphaelle Peale, the son of the portrait painter, Charles Wilson Peale, was probably the first to produce finished pieces. George H. Hall and A. J. H. Way have been known by their paintings of fruit pieces. H. W. Parton and Ellen Robbins produced charming pictures of flowers in various groupings only to be excelled by the ideal and brilliant flower-pieces of John Lafarge. The latter excels especially as a colorist and decorator. Some still-life pieces have been produced by William W. Harnett with an almost photographic truthfulness to nature.

PALANQUIN, an Indian vehicle corresponding somewhat to the Roman litter and the modern European sedan-chair, but, unlike the latter, used for long distances by travelers where railways or good carriage-roads do not exist. It is a wooden box about eight feet long, four feet wide and four feet high, with wooden shutters which can be opened or shut at pleasure, and is constructed like Venetian blinds. At each end of the palanquin, on the outside, two rings are fixed, and the *hammals*, or palanquin-bearers, of whom there are four,

two at each end, support the palanquin by poles passing through these rings.

PALAPTERYX, a genus of fossil birds whose remains are found in the river-silt deposits of New Zealand, associated with the gigantic *Dinornis*, and which, like the *Dinornis*, resembled in the form of the sternum, and the structure of the pelvis and legs, the living wingless apteryx. *Palapteryx*, however, seems to have possessed rudimentary wings, in which respect it differed from *Dinornis*.

PALATINE, a village of Illinois, about twenty-five miles northwest of Chicago. It has manufactories of sash, blinds, and doors.

PALATKA, a village, the county-seat of Putnam county, Fla., situated on the west bank of the St. John's River, about seventy miles south of Jacksonville. It contains manufactories and is an important shipping point.

PALESTINE, a village, the county-seat of Anderson county, Texas, about 150 miles north of Houston. It produces a variety of manufactures, and has a good trade in lumber and hides. Population in 1890, 5,834.

PALEY, FREDERICK APTHROP, classical scholar, grandson of the author of the *Evidences*, born at Easingwold, England, in 1816. He resided at Cambridge till his conversion to the Roman Catholic faith in 1846, and later from 1860 till 1874, when he was appointed professor of classical literature at the Roman Catholic College at Kensington. He next went to live at Bournemouth, was twice classical examiner to London University, and for the classical trips at Cambridge, and continued till the sudden close of his life, in 1888, his arduous labors in classical scholarship. In early life at Cambridge he helped to found the Camden Ecclesiological Society, and published books on Gothic architecture; but the important work of his life began in 1844 with the first part of his edition of *Æschylus* with Latin notes. He re-edited *Æschylus* for the "Bibliotheca Classica," as well as *Euripides*, *Hesiod*, the *Iliad*, and completed the *Sophocles* of Mr. Blaydes, all for the same series; and also prepared minor editions of similar works, or parts of these, for the "Cambridge Texts" series. His *Propertius*, *Ovid's Fasti*, and *Martial* were less successful, but his three comedies of *Aristophanes*, *Theocritus*, and his *Select Private Orations of Demosthenes* (in conjunction with Dr. Sandys) were recognized as works of the very highest value. He published prose translations of the *Philebus* and *Theætetus* of Plato, the 5th and 10th books of *Aristotle's Ethics*, the *Odes* of Pindar, and the *Tragedies* of *Æschylus*, and renderings in verse of the 5th book of *Propertius* and *Fragments of the Greek Comic Poets*. Other works are a treatise on *Greek Particles*, *Greek Wit* (1881), and an unsatisfactory edition of the *Gospel of St. John*. Paley received the degree of LL.D. from Aberdeen in 1883. A sagacious textual critic and a sound exegete, he left behind him traditions of a high type of scholarship, of the age when yet scientific philology was not, and German might be neglected. In his later years he adopted a late date for Homer.

PALFREY, JOHN GORHAM, an American clergyman and historian, born in Boston, May 2, 1796, died in 1881. He was an able anti-slavery orator and politician; but is best known for his careful and scholarly *History of New England*.

PALGRAVE, FRANCIS TURNER, a gifted poet and critic, born in London, in 1824. He filled for five years the office of vice-principal of the Training College for schoolmasters at Kneller Hall, and afterwards was private secretary to Earl Granville, and an official in the educational department of the Privy-council. He succeeded Shairp as pro-

fessor of poetry at Oxford in 1886. He is best known as the editor of the admirably selected *Golden Treasury of English Lyrics*; *The Children's Treasury of Lyrical Poetry*; *The Sonnets and Songs of Shakespeare*; *Selected Lyrical Poems of Herrick, of Keats, and Treasury of Sacred Song*.

PALGRAVE, WILLIAM GIFFORD (1826-88), an English author, born in Westminster, January 24, 1826. He was educated at the Charterhouse School and Trinity College, Oxford, graduating with great distinction in 1846. Next year he obtained a commission in the Bombay native infantry, which, however, he soon resigned to become a priest in the Society of Jesus. After a course of study at Laval in France and at Rome he was sent at his own request as a missionary to Syria, where he acquired a wonderful intimate knowledge of Arabic. Summoned to France in 1860 by Napoleon III. to give an account of the Syrian massacres, he went disguised as a physician on a daring expedition at the emperor's expense through Central Arabia, traversing the entire Wahabi kingdom, and returning to Europe through Bagdad and Aleppo. With the consent of the emperor he published his *Narrative of a Year's Journey through Central and Eastern Arabia*, one of the best books of travel in the English language. Palgrave quitted the Society of Jesus in 1864, and was sent by the British government in 1865 to treat for the release of Consul Cameron and the other captives in Abyssinia. He was nominated consul to Sukhum-Kalé in 1866, at Trebizond in 1867, at the island of St. Thomas in 1873, at Manila, in 1876, and consul-general in the principality of Bulgaria in 1878, and in Siam in 1880. He was appointed British minister to Uruguay in 1884, and died at Monte Video, September 30, 1880.

PALI, the commercial capital of Jodhpur, forty-five miles by rail from Jodhpur City.

PALIKAO, a place on the canal between Pekin and its port on the Peiho. Here in 1860 was fought an engagement between the Anglo-French troops and the Chinese, and hence the French general, Cousin-Montauban (1796-1878), who was minister of war in August and September, 1870, received his title of Count Palikao.

PALINURUS, Æneas's helmsman who was lulled to sleep at his post and fell into the sea. When Æneas visited the lower world he related to him that on the fourth day after his fall he made the coast of Italy, and was there barbarously murdered, and his body left unburied on the strand. The Sibyl prophesied that his death should be atoned for, a tomb erected to him, and a cave (Palinurus, the modern *Punta della Spartivento*) named after him.

PALISANDER WOOD, a name sometimes given to rosewood.

PALIURUS, a genus of trees and shrubs of the natural order *Rhamnaceæ*, nearly allied to the genus *Zizyphus*, but very different in the fruit, which is dry orbicular, and girded with a broad membranous wing. *P. aculeatus* is often called Christ's Thorn, from the fancy that it supplied the crown of thorns with which our Saviour was crowned. It is a deciduous shrub or low tree, with slender, piliat branches and ovate three-nerved leaves, each of which has two sharp spines at the base, one straight and the other re-curved. It is a native of the countries around the Mediterranean, of India, and many parts of Asia. It is often used for hedges in Italy and other countries.

PALK STRAIT, the northern portion of the shallow passage between the south coast of India and the island of Ceylon.

PALLICE, LA, a harbor opened in 1889 to receive large transatlantic and other ocean-going vessels bound for La Rochelle in France, whence it is less

than three miles distant. It consists of an inner basin $28\frac{1}{2}$ acres in extent and an outer harbor protected by two moles, each 1,380 feet long.

PALLISER, SIR WILLIAM, O. B., born at Dublin, June 18, 1830, died Feb. 4, 1882. He entered the army as a cavalry officer, and in 1863 invented the chilled shot that bears his name, and a system of strengthening cast-iron ordnance by the insertion of a steel tube. He retired in 1871, and sat for Taunton as M. P.

PALM, a measure of length, originally taken from the width of the hand, measured across the joints of the four fingers. In Great Britain a palm is, somewhat loosely, understood to be the fourth part of an English foot, or three inches.

PALMA, a town of Sicily, fourteen miles southeast of Girgenti. Population, 11,702.

PALMER, a pilgrim who had performed the pilgrimage to the Holy Sepulchre, and had returned, or was returning home after the fulfillment of his vow. The Palmers were so called from their carrying branches of the Oriental palm, in token of their accomplished expedition. On arriving at their home they repaired to the church to return thanks to God, and offered the palm to the priest, to be placed upon the altar.

PALMER, a village of Massachusetts, on the Chicopee River, about fifteen miles east of Springfield. It has manufactories of carpets, machinery, carriages and hats. Population in 1890, 6,898.

PALMER, BENJAMIN MORGAN, a Presbyterian minister, born at Charleston, S. C., in 1818. He has held Presbyterian pastorates at Savannah, Ga., Columbia, S. C., and since 1866 has been at New Orleans. He assisted in establishing the "Southern Presbyterian Review," in 1847, and has been one of its editors. He earnestly supported the secession movement and the Confederate cause. He is the author of *The Life and Letters of Rev. James Henley Thornwell* (1875); *Sermons* (2 vols.); and *The Family in its Civil and Churchly Aspects* (1879).

PALMER, ERASTUS DOW, an American sculptor, born at Pompey, N. Y., in 1817. He was in early life a carpenter, and later a successful cutter of cameos. He turned his attention to sculpture about 1852; and has produced many fine mythological and allegorical groups. His *Landing of the Pilgrims*, for the capitol at Washington, is a fine group of fifteen figures.

PALMER, JAMES CROXALL, surgeon-general of the U. S. Navy, born at Baltimore, Md., in 1811; died at Washington, D. C., in 1883. He studied medicine at the University of Maryland, and was commissioned assistant-surgeon in 1834, and surgeon in 1842. During the Mexican war he served off the coast of Mexico, afterwards in the Pacific, and on the steam frigate Niagara during the first attempt to lay the Atlantic cable. On the latter occasion he originated a plan for splicing the wire in mid-ocean. At the outbreak of the civil war he took medical charge of the United States Naval Academy then removed to Newport, R. I. In 1863 he joined Admiral Farragut's blockading squadron. He was attached to the flagship Hartford during the battle of Mobile Bay, Aug. 5, 1864. At the close of the war Dr. Palmer returned to the North, and was afterward in charge of the naval hospital at Brooklyn for years. In 1871 he was commissioned medical director, and in June, 1872, he became surgeon-general of the navy, but retired a year later.

PALMER, JOHN McCauley, an American general and statesman, born in Kentucky in 1817. He became a lawyer in Illinois; State senator in 1852; delegate to the peace convention in 1861; colonel of volunteers on the outbreak of the war; major-

general 1862-66; and was governor of Illinois from 1869 to 1873.

PALMER, JOHN WILLIAMSON, American physician and author, born in Baltimore in 1825. He studied medicine in Philadelphia; went to California; thence to China; was active in the cause of the Southern Confederacy and became an editor in his native city. In 1855 he married Henrietta Lee, author of the *Heroines of Shakespeare*. He has written and translated many novels and plays; but is best known for his works on East Indian manners and customs.

PALMER, RAY, an American theologian, born in Rhode Island in 1808, died March 29, 1887. He wrote many hymns and sacred poems among which is the hymn *My Faith Looks Up to Thee*.

PALMETTO, see Palms in Britannica, Vol. XVIII, pp. 189-191. The Palmetto is the American representative of the palm family. It extends



PALMETTO.

northward as far as the latitude of North Carolina. Two genera and four species of palmetto exists in the region between North Carolina and Florida. The most important species is the "cabbage" palmetto (*Sabal palmetto*), which sometimes grows 50 feet in height and 15 inches in diameter, with leaves five feet long and broad. It is found also in the Bermudas. Its products are timber and the leaves, the former being exceedingly durable, very porous, and especially valuable for wharf-building, as it resists water and is not attacked by the teredo. The fruit is not edible. The leaves are made into hats, baskets, mats, etc. The terminal bud or "cabbage" is eaten. It consists of a circle of unexpanded leaves, and forms one of the most delicious table vegetables.

PALMETTO-LEAVES, the leaves of the Palmyra palm, imported for the manufacture of hats and mats.

PALMIERI LUIGI, an Italian meteorologist, born April 22, 1807. He taught mathematics in several lyceums, became in 1847 professor at Naples, and in 1854 director of the observatory on Vesuvius. He has invented many meteorological instruments, and written several works on volcanoes and seismology.

PALMYRA, a village, the county-seat of Marion county, Mo., five miles west of the Mississippi River, and fifteen miles northwest of Hannibal. It is an important agricultural center, contains several manufactories, and is the seat of a number of educational institutions.

PALMYRA, a village of New York, about twenty miles east of Rochester. It manufactures printing

presses, scales, grain-drills and other machinery, and is an important trade-center.

PALMYRA, a village of North Carolina, near the Roanoke River, about eighteen miles north of Tarborough. It is an important shipping-point for the products of an extensive district.

PALMYRA WOOD, properly the wood of the Palmyra palm; but the name is generally used for all kinds of imported palm-tree wood; much of which is the wood of the cocoa-nut palm, *Cocos nucifera*, and the allied species *C. plumosa*.

PALO ALTO, thirty miles from San Francisco, the seat of a university founded at a cost of upwards of \$15,000,000 by United States Senator Leland Stanford of California. The institution is to provide, entirely gratis, education from the Kindergarten stage to the most advanced instruction that human teachers can supply; and all the pupils are to board on the premises, at the smallest possible charge.

PALO ALTO, a battle-field, about nine miles northeast of Matamoras, Texas. Here, on May 8, 1846, 6,000 Mexicans were defeated by 2,000 Americans under Gen. Taylor.

PALTOCK, ROBERT, an English writer, born in London about 1699, died March 20, 1767. He was educated at St. Paul's School, was bred to the law, and while in Clement's Inn secured his title to remembrance by writing the tale of *Peter Wilkins*, a *Cornish Man*, published anonymously in 1750, and often reprinted. The authorship, known to some in 1802, remained generally a mystery till 1835, and first appeared on the title-page in 1839.

PAMLICO SOUND, a shallow body of water, some 75 miles long by 10 to 25 miles wide, on the coast of North Carolina, separated from the ocean by long, narrow islands of sand, with narrow passages.

PANA, a city of Illinois, about forty miles southwest of Springfield. It contains many manufactories, is an important center of trade, and is the seat of an academy. Population in 1890, 5,067.

PANCOAST, JOSEPH, an American surgeon, born in New Jersey in 1805, died in 1882. He was the author of many valuable professional works, and a prominent teacher of surgery and anatomy.

PANCRAS, ST., the son of a heathen noble of Synnada, in Phrygia. He lost both parents while a boy, and was taken to Rome by an uncle and there baptized, but was slain in the Diocletian persecution, being only 14 years old. The first church that St. Augustine consecrated in England was dedicated to St. Pancras; it stood at Canterbury.

PANDEAN PIPES, a series, fastened side by side, of short reeds or pipes, graduated in length so as to give out different notes when blown across their mouths.

PANDHARPUR, a town of British India, 112 miles southeast of Poona, on a branch of the Kistna. It is highly revered by the Hindus on account of a temple dedicated to an incarnation of Vishnu. Population, 16,910.

PANDOURS, a people of Servian origin who lived among the mountains of Hungary, near the village of Pandour in the country of Sohl. The name used to be applied to that portion of the light-armed infantry in the Austrian service raised in the Slavonian districts on the Turkish frontier. They originally fought after the fashion of the "free-lances," and were a terror to the enemy, whom they annoyed incessantly. Their appearance was exceedingly picturesque, being somewhat Oriental in character, and their arms consisted of a musket, pistols, a Hungarian sabre, and two Turkish poinards. Their habits of brigandage and cruelty rendered them, however, as much a terror to the people they defended as to the enemy, and

about 1750 they were put under stricter discipline, and gradually incorporated with the regular army. The name is now obsolete.

PANGE LINGUA (Lat., "Now, my tongue the mystery telling"), one of the most remarkable of the hymns of Roman Breviary, and like its kindred hymn, *Lauda Sion*, a most characteristic example of mediæval Latin versification. The *Pange Lingua* is a hymn in honor of the eucharist and belongs to the service of the Festival of Corpus Christi. It was written by the great Angelic Doctor, Thomas Aquinas, and consists of six strophes of verses in alternate rhyme. Besides its place in the office of the Breviary, the "Tantum ergo," a portion of this hymn, forms part of the service called Benediction with the Blessed Sacrament, and is sung on all occasions of the exposition, procession, and other public acts of eucharistic worship.

PANSLAVISM, a movement with the aim of drawing closer together all the various races of Slavonic stock, and combining their influences in political and other directions. Some extreme Slavophiles have even proposed an actual amalgamation in nationality, language, literature, and religion. The first literary representative was the Slovak poet Kollar and the movement showed first in Bohemia, where the philological and historical work of Schafarik and Palácky contributed to give it impetus. The Poles of Prussia resisted Germanization; Serbs, Slovaks, and Croats asserted their rights against their Magyar masters; and the still less fortunate Slavs of Turkey gladly swelled the chorus. But at the first great Panславic congress at Prague in 1848 the most convenient medium of intercourse proved to be the tongue of the alien Germans! Russia, after being called to suppress the Hungarian revolution, came to be regarded as the protector of the Slavs; and the papers and periodicals of Russian Slavophiles, such as Aksakoff and Katkoff, heartily promoted this growing feeling. The growing dominance of Russia caused the Poles to withdraw their hearty support, and even the Czechs began to fear that Panславism, under Russian guidance, looked like Panrussism. There were no Poles at the second congress of Moscow in 1867; but Russia found a most receptive field for her propaganda in Bulgaria, Servia, and Macedonia. And in the recurrent crises of the Eastern question Russia became more pronouncedly the protector of all Eastern Christians. The Austrian Slavs put into the background by the reconstitution of the Austro-Hungarian monarchy in 1867, which gave so much more power to the Magyars. The war in the Balkan Peninsula in 1875-78 was doubtless largely due to Panславist intrigue as well as to Christian grievances; but the re-arrangements that have taken effect since the Berlin treaty, especially the resolute self-assertion of the Bulgarians, have somewhat dis-illusioned Russian Panславists.

PANTAGRAPH, or **PANTOGRAPH** (Gr. *panta*, "all;" *graphein*, "to delineate"), an instrument invented for the purpose of making copies, reduced or enlarged, of drawings or plans. It is made in various forms. Enlargements or reductions can now be done so much more accurately by means of photography that the pantagraph is nearly obsolete.

PANTHAYS, a Mohammedan community occupying the province of Yun-nan in the southwest of China, who asserted their independence in 1855. In 1859 they captured Talifoo, the second city of the province, and in 1858 the capital. Their leader Wen-soai (King Suleiman) established his authority over about 4,000,000 people, of whom not above a tenth were Mohammedans. In 1866 the Chinese government recognized the independence of the

Panthays, and in 1872 their king sent his son Hassan on a mission to Europe. Meanwhile, the Chinese again attacked the Panthays, defeated them utterly, and finally suppressed their empire.

PAOLA, a city, the county-seat of Miami county, Kan., on Peoria Creek, about forty-two miles south of Kansas City. It has a number of manufactories, and is the trade center of a fertile agricultural district. Population in 1890, 2,927.

PAOLI, a village, the county-seat of Orange county, Ind., about ten miles south of Orleans. It is the headquarters of various industries, and the Southern Indiana Normal School.

PAPA (Lat. "father"), the Latin form of the title now, in the Western church, given exclusively to the Bishop of Rome. Originally, however, meaning simply "father," it was given indiscriminately to all bishops. In the Greek church, whether in Greece proper or in Russia, papa is the common appellation of the clergy.

PAPAIN, a nitrogenous body, isolated from the juice of the tropical Papaw. The juice from which it is extracted is a milky, white, inodorous fluid, obtained by making incisions in the ripe fruit. From this papain is isolated by precipitation with alcohol after the fatty matters present have been removed. It has only recently been shown that papain possesses, like pepsin and trypsin, the power of digesting meat-fibre; and this digestion will go on in an alkaline, a neutral, or an acid solution. Hence it belongs to the group of digestive ferments, and like them is employed in some cases of dyspepsia.

PAPAW, a small South American tree of the natural order, *Passifloræ*, which has now been introduced into many tropical and sub-tropical countries. The fruit is eaten either raw or boiled. The seeds when chewed have in a high degree the pungency of cresses. The powdered seeds and the juice of the unripe fruit are powerful anthelmintics. The juice of the fruit and the sap of the tree render tough meat tender, and even the exhalations from the tree have this property. It bears fruit all the year, and is exceedingly prolific. The *Chamburu*, another species of the same genus, a native of Brazil, is remarkable for the extremely acrid and poisonous character of its juice, and the disgusting stercoraceous odor of its flowers. In the United States the name Papaw is given to the *Asimina triloba*, a small tree of the natural order *Anonacæ*, the fruit of which, a large oval berry, three inches long, with soft, insipid pulp, is eaten by negroes, but not generally relished by others. All parts of the plant have a rank smell.

PAPENBURG, a small port in the northwest of the province of Hanover, twenty-five miles west of Oldenburg by rail and near the Ems, with which it is connected by canals. Population, 6,916. In the neighborhood are extensive moors.

PAPER. For the growth of the American paper manufacture, the introduction of mechanically prepared wood-pulp and of wood fibre produced by chemical treatment, was of chief-importance. Since 1870, white pine and poplar slabs are ground by pressing them against a rapidly revolving millstone, while water flowing upon it washes the separated fibres away. This process, however, leaves the resinous matter in the wood. The pulp thus prepared can therefore only be used for admixture to other pulp which serves for the making of inferior papers, as wrapping paper, paper boards, etc. For fine grades of paper, chemically prepared wood-fibre is employed. This consists in the reduction of the wood to cellulose by boiling it with a disintegrating chemical under pressure. Houghton and Sinclair boiled it with 15-20 per cent. of

caustic soda under a pressure of ten atmospheres. Large quantities of wood-fibres have been prepared here in this way. But the heat and soda combined give the paper a brownish tint and weaken it. The chemical process of Dr. Mitscherlich, of Freiburg, Germany, prevents this. In this process the wood is boiled with bisulphite of lime. The pulp thus produced is of excellent quality, and the cost of the process is much lower than that of the soda process. Wood-fibre goes now into various grades of printing and writing papers, but some rags are employed with it. The Mitscherlich process was first extensively used in Germany. But it is at present more largely employed in the United States and Canada.

One other important step in paper-making is the bleaching of the pulp by electrolysis. This is an American invention. It has been in practical operation since 1888. Since it effects a saving of bleaching material and insures an economy in the manufacture of white paper, it will soon be generally introduced in the United States.

The varieties of paper made are chiefly the following four classes: (1) news and printing papers; (2) writing-papers of various kinds, blue, cream and yellow laid, and wove and tinted, and for account-books, etc.; (3) wrapping or packing papers, brown and purple, heavy manilla for cartridge and bags; (4) miscellaneous, such as light copying, tissue, and pottery papers, blotting and filtering, cigarette, etc. Lastly, there are all kinds of cardboards and mill-boards made.

In the printing papers generally, and especially in the better class of newspapers about 60 to 70 per cent. of wood pulp is used. Besides the wood pulp rags, cottonwaste, bagging, etc., enter into the composition. The process is as follows: These seemingly unpromising materials are first reduced to a pulp, and are then mixed with water until the mass assumes the consistency of good, old-fashioned country milk. This liquid is discharged from vats upon an endless moving wire belt, the water escaping through the interstices of the wire and leaving behind it, on the belt, the little fibres of wood, rags and cotton. Here is the sheet of paper in embryo, but it is yet wet and has not been pressed, and has but little strength. The damp sheet of fibres is transferred to a series of endless woolen blankets running over rollers. The web of paper becomes dryer and is pressed by the rollers. The fibres now adhere quite well together. The web is put upon an endless belt of canvas, traveling over cylinders filled with steam, which serve to dry the paper thoroughly. Next the paper—for such it has become—goes through calenders, which impart to it a smooth surface. It is then cut into sheets and is ready for the market.

There are now in this country about 1,000 paper and pulp mills, and in Canada about 70. The total daily production of paper in the United States was in 1881 about five millions of pounds. It rose in 1887 to eight millions of pounds. The following are the statistics of the paper trade of the United States for 1887:

Capital invested.....	\$80,000,000
Tons of paper made.....	1,200,000
Value of product.....	\$95,000,000
Number of hands employed.....	40,000
Wages paid.....	\$18,500,000

Many flour-barrels, buckets, car-wheels, and numerous other things are now made of paper. One factory in Iowa turns out 1,600 flour-barrels daily, each barrel taking 6 lbs. of paper. For general article on PAPER, see Britannica, Vol. XVIII, pp. 227.

PAPER BOATS. The United States Navy Depart-

ment purchased, in March, 1891, a paper whale-boat gig to be placed on board the next vessel fitted out for the use of the Navy. This boat effects a saving in weight of about 50 per cent. over the ordinary wooden boat of the same pattern, and it is claimed to be equal to the heavier wooden boat in every respect. The cost is about the same. Some experiments have already been made which show that the boat can be submerged for an indefinite length of time without the material becoming water-soaked or otherwise deteriorating.

PAPILIONACEÆ, a sub-order of the natural order *Leguminosæ*, whose plants have flowers of the peculiar structure called *papilionaceous*, and of which the pea and bean afford familiar examples. The number of *Papilionaceæ* is very great—about 4,800 species being known. They are found in all parts of the world, abounding in the tropics. Many have superb and beautiful flowers; many are plants of beautiful form and foliage, trees, shrubs, or herbaceous plants; many possess valuable medicinal properties, and many are of great importance as furnishing food for man and domestic animals, others as furnishing dyes, fibre and timber.

PAPINEAU, LOUIS JOSEPH, a Canadian statesman, born at Montreal in October, 1789, died at Montebello, in Quebec, Sept. 23, 1871. At twenty he was elected to the legislative assembly, and speedily worked his way to the head of the radical or French-Canadian party, and in 1815 was chosen speaker of the house of assembly for Lower Canada, a post that he held until 1837. He opposed the union of Upper and Lower Canada, formulated the grievances and demands of his party in the ninety-two resolutions, and agitated actively against the imperial government. When the province rose in rebellion in 1837, a warrant was issued against Papineau for high-treason, though he took no active part in the fighting. He escaped to Paris; but returned to Canada and was pardoned in 1847.

PAPULES, or **PIMPLES**, solid small elevations of the skin, either pale in color or inflammatory and more or less red. Papules occur as an early stage in the development of the eruption in many skin diseases—for example, in eczema, where they speedily become vesicles; or in acne, where they become pustules. The papular diseases proper, where the eruption in its fully developed form consists of papules, are lichen and prurigo.

PARA, the name which the river Tocantins receives in its lower course, from the Cameté downwards. It is twenty miles broad opposite the City of Pará, and forty miles broad at its mouth. The Parana, an arm of the Amazon, which cuts off Marajó Island from the mainland, pours into it part of the waters of the great river.

PARA, a coin of copper, silver, or mixed metal, though most generally of copper, in use in Turkey and Egypt. It is the 40th part of a piastre and varies much in value, owing to the debased condition of the Turkish coinage.

PARADISE, a village of Pennsylvania, about sixty miles west of Philadelphia. It has a good local trade, and manufactures leather and carriages.

PARADISE-FISH, a Chinese species of *Macropod* often kept in aquaria for its beauty of form and coloring. In the male the colors increase in brilliancy at the pairing-season, and he swims around his wished-for mate, fluttering the long, delicate filaments of the ventral fins, or erecting those of the tail fin like a peacock's train in miniature.

PARADOXIDES BEDS, a term sometimes applied to the Harlech or Longmynd and Menevian rocks of Great Britain, which are characterized by

the presence of trilobites belonging to the genus *Paradoxides*.

PARAGUAY, REPUBLIC OF. For general article on PARAGUAY, see *Britannica*, Vol. XVIII, pp. 242-245. An imperfect census of March 1, 1887, gives the area and population as follows: Area (probably correct) 91,970 square miles; population, 329,645, including 155,425 males and 174,220 females. There were, besides, 60,000 semi-civilized and 70,000 uncivilized Indians. Of foreigners in Paraguay in 1887, there were 5,000 Argentines, 2,000 Italians, 600 Brazilians, 740 Germans, 500 French, 400 Swiss, and 100 English. The country is divided into twenty-three electoral districts. The population of the capital, Asuncion, was 24,838 in 1886; other towns are, Villa Rica, 11,000; Concepcion, 11,000; San Pedro, 12,000; Luque, 8,000—including their district.

In 1886 there were 100 immigrants; in 1887, 563; in 1888, 1,064. In the three months ending June 30, 1889, there were 503 immigrants, of whom 190 were Italians, 84 Spaniards, 77 French, and 62 Germans. About one-third of the inhabitants are living in the central districts, containing the capital, a third in the districts of Villa Rica and of Cuasapá, the rest being spread thinly over the remaining portion of cultivated country, which was formerly pretty well populated.

Nearly three-fourths of the territory was national property; but in recent years most of it has been sold, much of it in very large estates.

CONSTITUTION AND GOVERNMENT.—A new constitution was proclaimed on November 25, 1870. The legislative authority is vested in a congress of two houses, a senate and a house of deputies, the executive being entrusted to a president, elected for the term of four years, with a non-active vice-president at his side. The senate and chamber of deputies are elected directly by the people, the former in the ratio of one representative to 12,000 inhabitants, and the latter one to 6,000 inhabitants, though in case of the sparsely populated divisions a greater ratio is permitted. The senators and deputies receive each 200*l.* per annum.

The president of the republic, Don Juan G. Gonzales, was elected September 1890.

The president exercises his functions through a cabinet of responsible ministers, five in number, presiding over the departments of the interior, of finance, of worship and justice, of war, and of foreign affairs. The president receives a salary of \$9,500 a year; the vice-president \$2,800, and each of the ministers \$3,000 a year; but the total administrative expenses are stated not to exceed \$25,000.

The country is divided into twenty-three counties (*partidos*), which are governed by chiefs and justices of the peace, assisted by municipal councils.

RELIGION, EDUCATION AND JUSTICE.—The Roman Catholic Church is the established religion of the state, but the free exercise of other religions is permitted. Education is free and compulsory. In 1887 only 20 per cent. of the Paraguayans and 60 per cent. of adult foreigners could read and write. There were in 1888 150 public elementary schools, with 28,526 pupils. In 1887 there were only 138 schools, with 15,180 pupils. There are, besides, over 100 schools subsidised by the council of education, and at Asuncion there is a national college, with fifteen professors and 150 students.

In Asuncion there is also a public library, and five newspapers are published in that city.

A high court of justice, and various inferior tribunals, with local magistrates, exercise judicial functions.

FINANCE AND COMMERCE.—The public revenue of Paraguay is derived mainly from customs duties. The revenue for 1889-90 is officially stated to be \$4,124,764; expenditure, \$4,152,797. The customs revenue in 1888 amounted to \$1,389,106; in 1889 to \$1,419,880.

The external debt has been reduced by various arrangements, and on January 1, 1890, amounted to \$23,521,544, including the consolidated English debt annuity of \$4,220,250. The internal debt has (1890) amounted to \$11,035.

The total value of imports from all directions in 1887 was 2,442,116 pesos, the exports in all directions 2,005,610 pesos. In 1888, imports \$3,289,757, exports \$2,588,608. The chief imports are textiles, valued at 712,938 pesos in 1887; wines 199,823 pesos, rice 449,354 pesos.

The value of *yerba maté*, or Paraguayan tea, in 1882, was 964,800 pesos; in 1884, 729,351 pesos; in 1885, 616,573 pesos; in 1887, 520,116 pesos; the other chief exports being tobacco, in 1881, 658,650 pesos; in 1882, 410,380 pesos; in 1884, 248,960 pesos; in 1885, 428,846 pesos; in 1887, 691,858 pesos; and hides and skins, 278,687 pesos in 1887.

PRODUCTIONS.—The number of horned cattle in Paraguay in 1887 was 730,000, sheep 32,000, horses 62,000, goats 11,000, pigs 12,000. The chief agricultural products besides yerba and tobacco are, maize, rice, wheat, mandioca, and cotton, barely sufficient for home consumption. In 1882, 37,500,000 lbs. of sugar were produced. Only 158,100 acres were under cultivation in 1887—viz: maize 58,000 acres, mandioca 41,400 acres, beans 22,300 acres, tobacco 16,300 acres, sugar 7,100 acres, rice 3,400 acres, sundries 8,800 acres.

There were in 1887, 1,198 factories, tanneries, mills, and houses of business, with an aggregate working capital of 4,550,000 pesos, giving employment to 2,600 persons.

DEFENSE AND INTERNAL COMMUNICATIONS.—The entire force, kept chiefly for preservation of internal order, consists now of 623 men, organized in one battalion of infantry, two squadrons of horse, and one brigade of artillery. There is a national guard which may be called out in time of war, and in which service is obligatory. There is a screw steamer of 440 tons and 4 guns, and two small steamers on the river.

In 1889, 933 vessels, of 36,503 tons, entered the port of Asuncion, and 930 of 33,735 tons cleared.

There is a railway of 92 English miles, from Asuncion, the capital, to Villa Rica. Receipts in 1887 amounted to 161,550 pesos, and the expenses to 111,337 pesos. A concession was granted in 1887 for the extension of the railway through the southern part of the republic to the river Paraná, and another towards the Bolivian frontier. There are about 60 miles nearly ready (December, 1890) for opening beyond Villa Rica. In the republic there are about 25 kilometres of tramway. The river navigation is important; in 1887, 1,100 vessels of 41,250 tons entered, and 1,046 of 41,624 tons cleared during the year. There is a line of telegraph at the side of the railway; the national telegraph connects Asuncion with Corrientes in the Argentine Republic; and thus with the outside world; there were 23,437 messages in 1889. The telephone is in operation at Asuncion, with a network of 1,000 kilometres of wire. Paraguay joined the postal union in 1881; the number of letters, newspapers, etc., transmitted in 1888 was—inland, 256,267; international, 282,886; in all, 539,153; the corresponding number in 1887 was 438,846.

MONEY AND CREDIT.—There are several banks in Paraguay. That patronized by the government, the national bank, had May, 1889, a bank-note cir-

ulation of \$947,915; on October 31, 1889, its accounts balanced at \$4,473,982. Those of the commercial bank March 31, 1890, balanced at \$1,988,839. The agricultural bank began in July 1888, with a view to lending small sums for agricultural purposes.

PARALLEL FORCES, forces which act in parallel lines, such as the weights of the portions that make up any framework or structure on the earth's surface. With the exception of a particular case parallel forces have always a single resultant, which is readily found by the method of moments.

PARALLELOPIPED, a solid figure having six faces, the faces being invariably parallelograms, and any two opposite faces equal, similar and parallel. If the faces are all squares, and consequently equal, the parallelopipe becomes a cube.

PARAMECIUM, or **SLIPPER ANIMALCULE**, an infusorian common in pond water or in vegetable infusions. In shape it is an asymmetrical oval, in length about $\frac{1}{100}$ of an inch. If dry grass be steeped in a glass of water for some days, the animalcules dormant about the stems revive and multiply very rapidly. Each paramecium is covered with rows of cilia which lash it through the water and drive food-particles into an aperture which serves as a mouth. A paramecium often divides transversely into two; these two repeat the process, and with continually diminishing size rapid multiplication may thus proceed for a while. It has its limits, however, and then two individual infusorians conjugate, exchange some of the material of their paranuclei, and separate.

PARANA, a southern state of Brazil, on the coast, with an area of 85,453 square miles, and a population of 187,548, including several colonies of Germans and Italians. The capital is Curitiba with a railway to Paranaguá, the port of the state.

PARANA, the capital of the Argentinian province of Entre Rios. It stands on a high bluff, overlooking the Paraná, opposite Santa Fé, 410 miles from Buenos Ayres. The town was the capital of the Confederation from 1862 to 1861; afterwards it sank rapidly, but has now again a population of 15,009.

PARASITE, (Gr. from *para*, "beside," *sitos*, "food;" one who eats with another; hence, one who eats at the expense of another), a common character in the Greek comedies; a low fellow, who is ready to submit to any indignity that he may be permitted to partake of a banquet, and who lives as much as possible at the expense of others.

PARCHIM, a town of Mecklenburg-Schwerin, twenty-three miles southeast of Schwerin. Population, 9,726.

PARDOE, JULIA, an English authoress, born at Beverley in 1806, died Nov. 26, 1882. She published poems and a novel in her fifteenth year, and *Traits and Traditions of Portugal* in 1833. A visit to Constantinople in 1836 led to her *City of the Sultan*, *Romance of the Harem* and *Beauties of the Bosphorus*. She next visited Hungary, and wrote *The City of the Magyar*, and a novel, *The Hungarian Castle* (1842). A series of works deals with French history. Others of her numerous works are, *The Confessions of a Pretty Woman*; *Flies in Amber*; *The Jealous Wife*; *Reginald Lyle*; *Lady Arabella*, and *The Thousand and One Days*. She received a pension of \$500 in 1859.

PARDON. The power of pardoning crime is, by the constitution and laws of most of the States of the American Union, conferred upon the governors of the respective States. In the following States, however, the governor is assisted by an executive council, when the question of pardon is to be de-

cided: Maine, Florida, Louisiana, New Hampshire, New Jersey, North Carolina, and Vermont. In Pennsylvania, the governor grants pardons only on the recommendation of a board of pardons. See *Britannica*, Vol. XVIII, pp. 271, 272.

PAREGORIC, or **PAREGORIC ELIXIR**, the *Compound Tincture of Camphor* of the pharmacopoea. It consists of an alcoholic solution of opium, benzoic acid, camphor, and oil of anise, every fluid ounce containing two grains each of opium and benzoic acid, and one and a half grains of camphor. This preparation is much used both by the profession and the public. It has been found useful in chronic rheumatism, and, especially in the case of children, to relieve slight pains in the stomach and bowels.

PAIREIRA-BRAVA, a lofty climbing shrub inhabiting the forest of Peru and Brazil, and bearing bunches of oval berries resembling grapes. The plant yielding the root of commerce is the *Chondrodendron tomentosum*, which has a long branching woody root, of a yellowish to a greenish brown color internally, and has attained considerable reputation in medicine.

PARELLA, a name given to some of those crustaceous lichens which are used to produce Archil, Cudbear, and Litmus, but which more strictly belongs to one species, *Lecanora parella*, and the red or crimson dye prepared from it.

PAPEA-ROSA, see *Rosa*, in these Revisions and Additions.

PARIS, CITY OF. For general article on **PARIS**, including map, see *Britannica*, Vol. XVIII, pp. 274-95. Since the establishment of the republic, the work of improving the city has gone steadily forward, new streets have been opened near the *Paris Bourse* de Commerce and the post-office; the *Champs de Mars*, a waste of sand, has been converted into a beautiful garden, in which rises the *Eiffel tower*; the museums of the *Jardin des Plantes* have been rebuilt; the *Quartier Latin* has been covered with educational buildings. In 1890-91, two great undertakings were mooted—a system of metropolitan railways to connect the great Paris stations with the heart of the city, and the conversion of Paris into a seaport by the deepening of the *Seine*, or the construction of a ship-canal to the *Channel*. The enthusiastic advocates of the latter scheme predict that in a few years it will make Paris the largest city in Europe and the center of the commerce of the world.

Early in 1890, a scheme was revived and modified for supplying each inhabitant of the city with 250 litres of good water daily, instead of the totally inadequate 100 litres, which had necessitated resort to the *River Seine*. The proposed sources are near *Verneuil*, about 100 kilom. from Paris, at the confines of Normandy and the *Isle of France*. The cost was estimated at 35,000,000 fr., of which 8,000,000 were to be set aside to indemnify the riparian owners of the tributary *Ayre* for the withdrawal of water from the sources of that stream. On July, 1890, the senate passed the bill. In October it was reported that work had already been begun on that portion of the scheme which involved tunneling under the heights of *Marly* and the park of *St. Cloud* for a length of $4\frac{1}{4}$ miles, and at some points at a depth of 215 feet.

At this writing (1891) the project of an underground tramway system for the city is under consideration with apparently increasing favor.

Paris reported in the census of Dec. 31, 1886, a population of 2,344,450. The relation of Paris in respect of population, to the other principal cities of France, is shown by the following table compiled from census of 1886:

Paris.....	2,344,550	Calis.....	58,965
Lyon.....	401,560	Tourcoing.....	58,005
Marseille.....	379,143	Le Mans.....	57,591
Bordeaux.....	240,552	Montpellier.....	56,765
Lille.....	188,272	Besançon.....	56,511
Toulouse.....	177,617	Grenoble.....	52,484
Nantes.....	177,482	Versailles.....	49,852
St. Etienne.....	177,875	St. Denis.....	48,009
Le Havre.....	173,074	St. Quentin.....	47,353
Rouen.....	167,163	Troyes.....	46,972
Boubaix.....	100,299	Clermont-Ferrand.....	46,718
Reims.....	97,903	Boulogne.....	45,916
Amiens.....	80,288	Caen.....	43,899
Nancy.....	79,055	Bourges.....	42,829
Nice.....	77,478	Béziers.....	42,755
Angers.....	73,044	Avingnon.....	41,707
Brest.....	70,778	Lorient.....	40,165
Toulon.....	70,132	Dunkerque.....	38,025
Nîmes.....	69,898	Cette.....	37,058
Limoges.....	68,477	Cherbourg.....	36,878
Rennes.....	66,139	Rochefort.....	31,256
Dijon.....	60,855	Paul.....	30,022
Orléans.....	60,826	Boulogne.....	30,022
Tours.....	59,585	Donau.....	30,030

PARIS, a city, the county-seat of *Edgar county*, Ill., about fifteen miles south of *Danville*. It is an important manufacturing and trade center. Population in 1890, 5,049.

PARIS, the county-seat of *Bourbon county*, Ky., on *Stoner Creek*, nineteen miles northeast of *Lexington*. It contains a military institute, and manufactures whisky, flour, and cordage. Population in 1890, 5,505.

PARIS, a village, the county-seat of *Oxford county*, Maine, picturesquely situated on a hill about fifty miles north of *Portland*. It produces various manufactures, and is the seat of two academies. Population in 1890, 3,100.

PARIS, a village, the county seat of *Monroe county*, Mo., on the *Middle Fork of Salt River*, twenty-five miles east of *Moberly*. It has manufactures of woollen goods and furniture, and is the trade center of a region rich in timber and coal.

PARIS, a village, the county-seat of *Henry county*, Tenn., seventy miles west of *Clarksville*. It has a lucrative trade in tobacco and cotton, contains several factories and mills, and is the seat of an academy.

PARIS, a city, the county-seat of *Lamar county*, Texas, ninety-eight miles northeast of *Dallas*. It has manufactures of brooms, furniture, sashes, wagons, ploughs, etc. Population in 1890, 8,254.

PARIS, a genus of plants of the small endogenous natural order *Trilliaceæ*, of which one species, *P. quadrifolia*, called *Herb Paris*, is common in moist, shady woods in some localities. It is rarely more than a foot high, with one whorl of generally four leaves, and a solitary flower on the top of the stem, followed by a berry. The berry is reputed narcotic and poisonous, but its juice has been employed to cure inflammation of the eyes. The root has been used as an emetic.

PARIS, COMTE DE, son of *Duc d'Orléans*, and grandson of *King Louis Philippe*, born at Paris in 1838. He was educated in England having left France after the overturn of the monarchy in 1848. He and his brother the *Duc de Chartres* served on the staff of *General McClellan* during part of the *American civil war*. He married in 1864 the eldest daughter of the *Duc de Montpensier*, and has three children. After the death, in 1885, of the *Comte de Chambord*, the head of the royal house of France, the *Comte de Paris* was acknowledged by nearly all the *Legitimists* as his successor. In 1886, on the passing of the expulsion bill, the *Comte de Paris* once more left for England. After his return from the *United States* he allied himself with the *Liberals* and *Republicans* against the empire, and subsequently with the *Legitimists* against *M. Thiers*. He is the author of an interesting and comprehensive work in six volumes on English

trade unions. He visited Lisbon in 1889 on occasion of the christening of his grandson, the infant prince of Portugal. His son, the Duc d'Orléans, was sentenced in 1890 to two years' imprisonment for having entered French territory in order to offer himself as a private soldier in the national army. He was, however, released after a short imprisonment.

PARIS BASIN, in geology, the area in which the Cainozoic systems of France are best developed.

PARIS GREEN, a cupric aceto-arsenite powder, called also mitis-green, emerald-green, imperial-green, French green, Vienna green, Schweinfurt green, and sometimes Scheele's green, from which it differs in that it contains acetic acid. As a pigment it is fairly permanent, somewhat lacking in body, and is sparingly employed by artists and decorators for the production of a vivid light green color. As an insecticide it is very poisonous, and is extensively used in the extermination of the cotton-worm, the potato bug, and other noxious insects.

PARIS SHIP CANAL. The project of opening up the port of Paris to the sea by the canalization of the river Seine, which had often been discussed, was definitely revived by the announcement, at the end of 1889 that a scheme had been formulated by M. Bouquet de la Grye, and been generally approved. The estimated expenditure for the work between Rouen and Paris was \$27,000,000. The plans and papers were exposed to public view at the Hotel de Ville from September to the middle of November. From these it appeared that the proposed canal from Rouen to Paris is to have a length of 180 kilomètres and a depth of 6 mètres, and the seaport is to be constructed between St. Denis and Clichy, the expense being estimated at 135,000,000 fr., the details of which were given. The duration of the journey from Rouen to Paris was stated to be 17 hours, and the dues 6½ fr. per ton. From Rouen, Nov. 1, 1890, it was reported that the council-general of the Seine Inférieure had refused to assent to the scheme.

PARIS, TREATIES OF. See the article TREATIES in these Revisions and Additions.

PARISHVILLE, a village of New York, on the west branch of St. Regis, about thirty-five miles east of Ogdensburg. The river, falling about 125 feet in a mile affords a fine water-power. The chief industries are the manufacture of lumber and of cheese.

PARK CITY, a village of Utah, about thirty miles east of Salt Lake City. It is an important silver and lead mining town.

PARKE, EDWARDS AMASA, an American theologian, author and educator, born in Rhode Island in 1808. He has been prominently connected with Amherst College and with Andover Theological Seminary, and was for many years an editor of "Bibliotheca Sacra." Among his most valuable writings are numerous biographies of prominent Americans.

PARKE, JOHN G., a distinguished American soldier, born in Pennsylvania in 1827. He graduated at West Point in 1840; became brigadier-general of volunteers in 1861; commanded at the capture of Fort Macon; was major-general in 1862; served thereafter as General Burnside's chief-of-staff, and later commanded the 9th corps. After the war he commanded a corps of engineers; and in 1887 he was appointed superintendent of the United States military academy.

PARKER, AMASA J., an American jurist, born in Connecticut in 1807, died in 1890. He was admitted to the bar in 1828; was elected to the legislature of

New York in 1833; entered Congress in 1837; was vice-chancellor of New York in 1844; and United States district attorney in 1859. He published several volumes of law reports, and assisted in the preparation of the *Revised Statutes* of 1859.

PARKER, FOXHALL A., an American naval commander and writer, born in New York City in 1821, died in 1879. He graduated at the Philadelphia Naval School; served in the Florida war and in the Mediterranean; became executive officer at the Washington Navy-yard in 1861; served with distinction throughout and since the war; was promoted to commander in 1862; captain in 1866; and superintendent United States naval academy in 1878. He was the author of valuable naval textbooks, and was a charming and miscellaneous writer.

PARKER, JOEL, an American jurist, born in New Hampshire in 1795, died in 1875. He practiced law at Keene; was judge of the New Hampshire supreme court in 1833; chairman of committee to revise the State laws in 1840; law professor at Harvard in 1847. He was the author of a number of political works.

PARKER, JOEL, an American divine, born in Vermont in 1799, died in 1878. He became president of Union Theological Seminary in 1840; and was editor of the "Presbyterian Quarterly Review."

PARKER, JOEL, an American statesman and soldier, born in New Jersey, in 1816, died in 1888. He was admitted to the bar in 1842; became State legislator in 1847; major-general of volunteers in 1861; and governor of New Jersey in 1862.

PARKER, JOSEPH, a popular English preacher and author, the son of a stone-cutter, born at Hexham, April 9, 1830, and like Spurgeon began to preach in early youth. He was ordained pastor of the Congregational Church at Banbury, and became minister of the Cavendish Street Church, Manchester, in 1858, and of Poultry Chapel, London, in 1869, now City Temple (opened 1874). He visited the United States in 1888 and received the degree of D. D. from Chicago University. As a preacher he is strong and vigorous, with a splendid command of racy English.

PARKER, PETER, an American missionary and governmental representative, born in Massachusetts in 1804, died in 1888. He studied theology and medicine; went to China, and established at Canton a highly hospital and medical training school. He represented the United States in various capacities, and in 1855 was commissioner with power to revise our treaty with China. After his final return in 1857 he became a regent of the Smithsonian Institution.

PARKER, WILLARD, a distinguished American physician and surgeon, born in New Hampshire in 1800, died in 1884. He was professor of anatomy and of surgery in various colleges; became professor of surgery in the New York College of Physicians and Surgeons in 1839; and president of the State Inebriate Asylum at Binghamton in 1865. He made many valuable physiological discoveries.

PARKER CITY, a borough of Pennsylvania, on the Alleghany, fifty miles south of Oil City. It is the trade center of a rich oil-producing region.

PARKERSBURG, a city, the county-seat of Wood county, W. Va. Population in 1890, 8,389. See Britannica, Vol. XVII, p. 301.

PARKES, SIR HENRY, K. C. M. G., an Australian statesman, born at Stoneleigh, England, in 1815. He emigrated to New South Wales in 1839, and at Sydney became eminent as a journalist, editing *The Empire* from 1849 to 1856. A member of the colonial parliament in 1854, he held various government offices and became prime-minister in 1872. He has

since been several times head of the ministry, and has been identified with the promotion of free trade. He was the representative of New South Wales at the colonial conference in London in 1887, and in 1891 was president of the council for arranging a federal union of the Australian colonies.

PARKHURST, JOHN, an English Biblical scholar, born at Catesby in Northamptonshire in June, 1728, died at Epsom, March 21, 1797. He was educated at Rugby and at Clare Hall, Cambridge, and took orders, but soon after retired to his estate at Epsom to give himself to study. In 1762 appeared his principal work, *A Hebrew and English Lexicon, Without Points*, a very creditable performance for its time, and long a standard work. Parkhurst also wrote a treatise against Dr. Priestly, to prove the divinity and pre-existence of Jesus Christ.

PARKMAN, FRANCIS, an American historian, born in Boston, Mass., Sept. 16, 1823. He graduated at Harvard in 1844, studied law for two years, then traveled in Europe, and returned to explore the Rocky Mountains. Parkman has worked his way to recognition as a historical writer on the period of the rise and fall of the French dominion in America. He has paid many visits to France to examine archives. His books are, *The California and Oregon Trail; The Conspiracy of Pontiac; Pioneers of France in the New World; The Book of Roses; Jesuits in North America; Discovery of the Great West; The Old Régime in Canada; Count Frontenac and New France under Louis XIV, and Montcalm and Wolfe*.

PARKS OF THE WORLD. See diagram, page 1199.

NEW YORK STATE PARK AT NIAGARA FALLS.—This is the official title given to a reservation on the New York side of Niagara Falls. The land of this park comprises 115 acres, and includes the former "Prospect Park." This land is reserved for the avowed purpose of preserving the scenery of the Falls of Niagara, and of restoring such scenery to its natural condition. It extends along the river-front from the upper suspension bridge to a point nearly a mile above the falls. For the land taken in by this park the State of New York paid the sum of \$1,433,429.50. The park was opened to the public July 15, 1885. The access to the grounds is free, but there are small charges for using the inclined railway and the elevators, for visiting the Cave of the Winds, and for riding on the steamer Maid of the Mist. All along the edge of the crags a space has been prepared for people to stand upon, from 20 to 30 feet wide, and extending from the brink of the falls to the high ground back of the wooden balcony, from all of which a fine view is had of the nearer fall, the river above it, the islands, the Canadian Falls and the Ontario reservation.

Similar improvements have been made on the Canadian side of the falls. The grounds taken here extend southward from the Clifton House for nearly two miles, and include the Cedar Islands, for which an admission is charged. The area of the Ontario reservation is about the same as that of the New York State reservation. But the Canadian government paid only \$402,000 for the land taken in by it.

PARK AREAS OF OTHER EUROPEAN CITIES.

	Acres.
Birmingham.....	211
Bradford.....	215
Brighton.....	105
Bristol.....	105
Dublin.....	442
Edinburgh.....	1,753
Glasgow.....	407
Hull.....	6,100
Leeds.....	3,600
	350

Leicester.....	06
Liverpool.....	523
London.....	1,790
Manchester.....	191
Newcastle.....	81
Norwich.....	7
Nottingham.....	150
Oldham.....	60
Plymouth.....	22
Portsmouth.....	81
Sheffield.....	49
Sunderland.....	24
Wolverhampton.....	50

OTHER AMERICAN CITY PARKS.

Lincoln Park, Chicago.....	230
Humboldt Park, Chicago.....	193
Garfield Park, Chicago.....	171
Bozings Park, Chicago.....	171
Union Park, Chicago.....	23
Burnett's Wood, Cincinnati.....	12
Lincoln Park, Cincinnati.....	12
Tower Grove Park, St. Louis.....	277
Northern Park, St. Louis.....	180
Shaw's Garden, St. Louis.....	109
Lindell Park, St. Louis.....	60
Lafayette Park, Baltimore.....	30
Patterson Park, Baltimore.....	70
Washington Park, Brooklyn.....	30

PARKS AND PARKWAY SYSTEM OF BOSTON.—The site selected for the park and parkway system of Boston lies south and east of the Charles River. Of this system, Boston Common, which is in the center of the city, is the radiating point. From the vicinity of the Common five avenues lead southerly to the annexed districts of Dorchester, Roxbury and Brighton, in which have been located the rural parks. The Common is a tract of 72 acres, a beautiful urban pleasure-ground, comprising vistas of trees, green turf, pools of water with cut-stone borders, a profusion of shrubbery and beautiful flowers artificially arranged, an antique burial-ground, a ball-field, monuments and other natural and artificial features. It is divided by Charles street, and from the foot of its lower division Commonwealth avenue, with its fine drive-ways, leads to the Fens of the Back Bay, the beginning of the parks and parkways.

The Parkway begins at the Fens in the low tract, where the Stony Brook and the Muddy River empty their waters into the Back Bay Basin, a natural depression, formerly a tide pool, but now mostly filled up. At this point the Park Commissioners bought 100 acres of land for a park, called the "Back Bay Park." Work upon this park was begun in 1879. An unsightly area was soon transformed into a beautiful recreation ground. The banks of the creek, which winds through this land, are now thickly set with trees, shrubbery and wild vines, intermixed with flowers and herbaceous growths of various hues. The Boylston Road, carried above the waterway on a stone-arch, curves across this park near the foot.

The parkway system is intended to form, with existing and projected city avenues, a continuous promenade from the Common through the Back Bay Fens to Marine Park by way of "Jamaica Park," the "Arboretum" and "Franklin Park." It will afford a passage having the character of a street of great width, strung with verdant features and other objects of interest. It follows up the fresh-water course of the Muddy River, a small stream bordered by rushy meadows and varied slopes from the adjoining upland, and adorned by trees in groups, diversified by thickets and open glades. In the upper valley is a chain of picturesque fresh-water ponds, alternating with attractive natural groves and meadows, the uppermost of these sheets of water being Jamaica Pond.

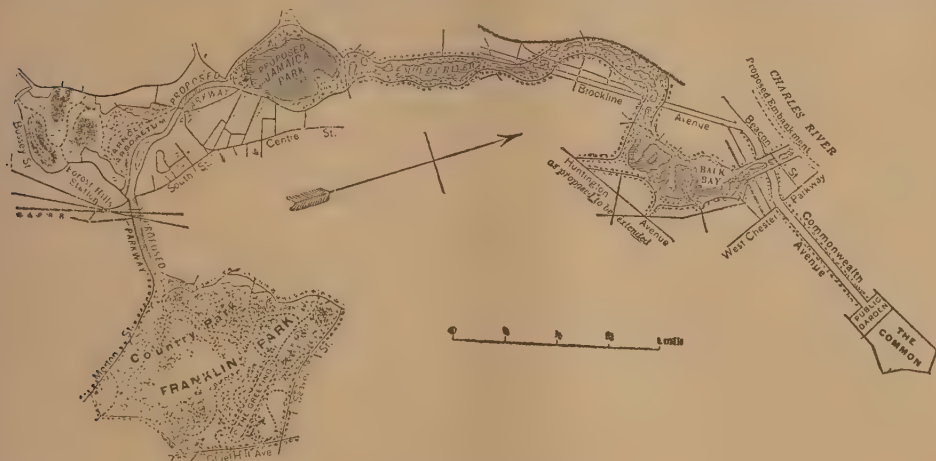
Besides the parkway, which follows the valley of the Muddy River in a southerly direction, there

are two extensive city avenues, "Commonwealth Avenue" and the "Beacon Street" widening, having the character of parkways, both important additions to the means for open air recreation of the people of Boston. These avenues connect the Common and the Fens with the existing spacious public pleasure grounds at Chestnut Hill, three miles away. Here are fine shade-trees and well-made drives and walks that pass between and around Chestnut Hill Reservoir, two broad artificial lakes, the whole area of the grounds being more than 200 acres in extent. Within the city a division of the parkway system, one and three-fourths miles in length, called the "Outer Pleasure Circuit of Back Bay," is made by connecting Beacon Street with the Audubon Road that winds through the Fens.

An arboretum is an open-air museum of living trees and other plants. The site of the "Arnold

A continuation of the parkway will bring us to "Franklin Park." This is the largest recreation ground in the Boston park system. It comprises 518 acres. The Roxbury Woods, a part of this park, is a rugged region of hills and dales, ledges, woods and meadows, commanding fine views. Most of it is covered by second growth timber. The general landscape effect of Franklin Park is of a broad dale winding between low-wooded slopes, giving a wide expanse of unbroken turf lost in the distance under scattered trees. To gain extent of turfy surface, old causeways, ridges, knolls, rocks and walls have been removed, hillocks reduced and abrupt depressions partly filled.

For public convenience the park is divided by a macademized road, Glen Lane crossing it from east to west, which is to be open night and day for all ordinary street uses. The division known as the



PARKWAY SYSTEM OF BOSTON.

Arboretum," shown at the left of our figure, comprises 167 acres, formed in part by cleared fields and in part by picturesque woodland, known as the Bussey Woods. It is intended that this arboretum shall contain and display representatives of all the genera of trees hardy in eastern North America, and also groups of trees varying in number from 6 to 25, allowing for every species sufficient space for its full growth. In a single year (1886) 70,000 trees and shrubs were permanently planted, and a large stone building was erected upon the grounds. The Arboretum is both a pleasure-ground and an open-air university for the study of botany and forestry. It is situated about four miles from the Common and easily reached by train or street cars. Its surface is strikingly diversified, comprising smooth grassy slopes, rocky hill-sides, partly wooded with numerous large trees and a small forest of hemlocks. Its eminences furnish noble outlooks over the surrounding country with distant prospects, in one direction stretching seaward over the city, and in another across a charming country-side to distant hills.

"Country Park" contains two-thirds of the ground. As it is inclosed by itself, it may be considered as the main park. A large part of the Country Park is to be wooded, and adapted to the use of picnic and basket parties. For this purpose a dairy will be established, so that family parties may be furnished with milk warm from the cow. Tennis-courts, croquet-grounds, archery ranges and small lawns for little children's festivities, are provided for in near connection with the various picnic grounds. But little more work is required to finish the surface of this park.

The "Greeting" is a system of parallel and contiguous drives, rides and walks under rows of trees, providing a promenade and meeting-ground one-half mile in length. Like the Playstead, it is to be without underwood; and these two adjacent divisions, which together will form an inclosed ground a mile in length, reaching across Franklin Park, are to be adapted by electric lighting for night as well as day use.

GREAT NATURAL PARKS OF COLORADO.—These parks constitute one of the chief interesting features of the State of Colorado. For a brief and partial description of them, see *Britannica*, Vol. VI, pp. 161-163. The four principal ones bear the names of North Park, Middle Park, Estes Park, and South Park. They are not small areas of ground hemmed in by neighboring hills or streams, but they are great territories, exceeding the areas of whole counties in some of the States. They contain fields and forests with great stretches of plains on which have roamed for many years immense herds of buffalo or cattle.

North Park is situated in the extreme northern part of the State, and covers a part of Routt and Larimer counties. It embraces an area of about 2,500 square miles and is traversed by the North Fork and Platte Rivers. It is about seventy-five miles long and five miles wide, with an altitude of 9,000 feet above ocean level. The ranges of the Rockies which environ it, rise nearly 5,000 feet higher. The park is in its general features an irregular plateau or basin, having a surface with gently rolling hills, and long level bottoms, and valleys clothed with luxuriant grasses and flowers. The hills are covered with timber.

Middle Park, located in Grand county, embraces an area of about 3,000 square miles, and has an altitude of 9,000 feet. Like North Park, it is environed by mountains. Its streams are tributary to Grand River. It contains Grand Lake, on the shore of which is the town of Grand Lake, the county-seat of Grand county. About ten miles from Grand Lake is Hot Sulphur Springs, recognized as an attractive spot for invalids and other visitors. The springs are six in number, the waters from which unite in a common stream and flow over rocks into a natural basin. The resorts of Middle Park are fast growing into popularity.

Estes Park is located at the foot of Long peak, about sixty miles from Denver and is one of the most beautiful resorts of Colorado. It is about six miles long and four miles wide, with an average height of 7,000 feet. The general contour is much like that of its sister parks, abounding in gentle slopes, dark pines, and beautiful winding trails leading from open glades of the valley up dark cañons. Its clear brooks unite to form a considerable stream named Big Thompson's Creek. The road to the park is difficult of ascent, but is largely traveled by tourists because of the numerous attractions by the way, and by the still greater attraction to be found in the park itself.

South Park, the chief of the park system of Colorado, lies to the south and east of Middle Park, and is isolated from it by a great snowy mountain range. It is fifty miles in length and about ten miles in breadth. Its northern extremity begins about seventy-five miles southwest from Denver and is reached by the Denver and South Park Railway. The maximum elevation is about 10,000 feet and the average elevation about 9,000 feet. Its streams are the tributaries of the South Platte River. Its soil is unexcelled in richness, with easy facilities for irrigation; and the numerous grassy plains are readily converted into luxurious fields of grain. The park is bounded on the east by a heavy timbered range 2,000 feet above the valley, while to the west are the snowy summits of "the Rockies." The South Park Mineral Springs, and Hartzell's Hot Sulphur Springs are in the southern portion of the Park, and gives promise of becoming points of great interest to invalids.

San Luis Park, Colorado, lies south of South Park, embraces an area of about 18,000 square miles. The beautiful San Luis Lake is a principal object of interest, and there are numerous thermal springs

possessing medical properties. This park has nowhere an altitude of more than 7,000 feet, and the climate is exceedingly mild and genial.

OTHER GREAT NATIONAL PARKS—*Calaveras Big Trees* is the collective name of a grove of mammoth trees, the *Sequoia gigantea*, situated in Calaveras County, California, seventy-five miles east of Stockton. This grove contains nearly 100 immense trees, which are a great attraction to the tourist and the student of nature. The largest of these, known as the Father of the Forest, and now lying prostrate, measures 435 feet in length, and 110 in circumference. The Keystone State, the tallest now standing, is 325 feet high, but the Empire State is regarded as on the whole the largest and finest of the trees. The bark of one of the trees cut was eighteen inches thick. The grove itself is about 3,200 feet long by 700 in breadth; in the vicinity are several other groves of giant trees of somewhat less note. The other most noted trees are:

Mother of the Forest.....	321 feet high, 90 feet circumference
Hercules.....	320 feet high, 95 feet circumference
Hermit.....	318 feet high, 60 feet circumference
Pride of the Forest.....	276 feet high, 60 feet circumference
Three Graces.....	295 feet high, 92 feet circumference
Husband and Wife.....	252 feet high, 60 feet circumference
Burnt Tree (prostrate).....	330 feet high, 97 feet circumference
Old Maid, Old Bachelor, Siamese Twins, Mother and Sons, Two Guardians, and others, of 261 to 300 feet in height.	

Mariposa Grove, a tract of land embracing really two groves about half a mile apart—within a total area of two square miles—is situated south of the Yosemite Valley about 25 miles. In this grove are between 400 and 500 immense trees whose average height is less, but whose average size is greater than that of the "Big Trees" in the Calaveras Grove. The largest is the Grizzly Giant, 94 feet in circumference, and its lowest branch 200 feet from the ground. The remains of a prostrate tree show that the total dimensions were 126 feet in circumference and 400 feet high. Three horsemen could ride abreast in the hollow of a section of it. Over 100 of the trees measure over 40 feet in circumference.

South Grove. This grove is technically named "Stanislaus" Grove, situated on Beaver Creek, five miles southeast of the Calaveras Grove. There are said to be 700 to 800 trees in this grove, several of them being excellent specimens, and most of them in fine condition.

King's Grove. King's and Kaweah grove is about 30 miles from Visalia, Cal., and is the largest one included in the "Big Tree" list. It covers an area of about $4\frac{1}{2}$ miles wide and 10 miles long. The largest tree is 106 feet in circumference, with a height of 276 feet. The number of the trees is very large, but few of them are over 60 feet in circumference.

Fresno Grove is situated in Fresno county, about 50 miles northwest of King's. This grove covers an area of $2\frac{1}{2}$ miles in length by one to two in breadth, and contains between 500 to 600 trees. The largest measures nearly 20 feet in diameter at three feet from the ground.

Crane Flat and Merced Grove consists of two groups of trees with a few scattered ones between them. One group is about a mile northwest of Crane Flat, on the Coulterville trail to the Yosemite; the other is three miles southwest of this on the new carriage road to the Yosemite. The trees are said to be smaller than those in the Calaveras Grove, the largest sound tree that has been measured being 57 feet in circumference.

Tule River Groves, one on the North Fork and the other on the South Fork. They are 15 miles distant from each other, and the north one is 30 miles from King's.

PARKS OF THE WORLD.

The following diagram furnishes a comparative view of the areas of the chief public parks of the world. Only those definitely set apart for, and dedicated to, the uses of the people of the countries severally are included in the list. The scale is 400 acres to the inch.

Windsor Park, Windsor Castle, 3,800 acres.

Fairmount Park, Philadelphia, 2,740 acres.

Water Park Vienna, 2,300 acres.

Bois de Bologne, Paris, France, 2,100 acres.

Phoenix Park, Dublin, 1,700 acres.

Royal Park, Munich, 1,300 acres.

Forest Park, St. Louis, 1,350 acres.

South Park, Chicago, 1,055 acres.

Golden Gate Park, San Francisco, 1,043 acres.

Golden Gate Park, San Francisco, 1,040 acres.

Central Park, New York, 843 acres.

Druid Hill, Baltimore, 680 acres.

Thiergarten, Berlin, 600 acres.

Prospect Park, Brooklyn, 550 acres.

Regent's Park, London, 450 acres.

Queen's Park, Edinburgh, 407 acres.

Hyde Park, London, 400 acres.

Schlossgarten, Stuttgart, 320 acres.

Grosse Garten, Dresden, 300 acres.

Victoria Park, London, 290 acres.

Eden Park, Cincinnati, 216 acres.

City Park, New Orleans, 150 acres.

Prospect Park, Buffalo, 150 acres.

New York State Park, Niagara, 115 acres.

Jardin de Plantes, Paris, 77 acres.

Jardin de Tuilleries, Paris, 50 acres.

Boston Common, 48 acres.

YELLOWSTONE NATIONAL PARK.—This public park, the largest in the world, was set apart by act of Congress of the United States, passed in February, 1872, and approved by the President March 1, 1872. It was taken mainly from the Territory of Wyoming (now a State), the remainder being taken from the Territory of Montana. Its area embraces about 3,575 square miles, or about 2,288,000 acres. In the language of the Congressional Act, the entire area is "reserved and withdrawn from settlement, occupancy or sale under the laws of the United States, and dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people." For the full text of the Congressional Act and for an extended description of the park, and the provision made for its supervision, see **YELLOWSTONE NATIONAL PARK** in these Revisions and Additions. The immense size of this park (*more than six hundred times the area of Windsor Park*) forbids its introduction into the illustrative and comparative diagram on this page.

ADIRONDACK PARK.—In accordance with and as promotive of a project long entertained, an effort is now (1891) being made to induce the legislature of the State of New York to set apart for a great public park a long tract of the forest region known as the Adirondack Mountains, in the northeastern portion of that State. A park association, composed of well-known and enterprising citizens, has the matter in hand, and it is hoped the project will be so laid before the ensuing legislature at its forthcoming session (January, 1892) as to secure early and affirmative legislative action. The plan includes the purchase by the State of from 5,000,000 to 4,000,000 of acres to be held in perpetuity for the State Park. The State already owns about 800,000 acres of the region desired for that purpose. Should the project, now assuming practical shape, be successful, the Empire State will have the honor of providing the greatest public park thus far established in the whole world. See **ADIRONDACK PARK** in these Revisions and Additions.

VERSAILLES.—The great park at Versailles is nearly 50 miles in circumference. It is divided into the large and small park—the latter being that immediately in rear of the palace, and including the beautiful gardens. Fountains, alleys and parterres abound in all directions. The great palace was 11 years in building, and was finally completed in 1672, but the royal court was not transferred thither until 1680. \$200,000,000 were expended upon the palace and the grounds. Rivers were turned from their courses that a supply might be made to the fountains. Here Louis XIV. attracted multitudes by the magnificences of his courts. Here, also, Louis XV. resided, and also the unfortunate Louis XVI., until the revolution in 1792. In the northwestern part of the park there are the two small palaces called the "Great and Little Triangous." The *Grandes Eaux*, or the play fountains, furnish the most interesting spectacle of the kind in the world.

PARLEMENT, the name applied in France, down to the revolution, to certain superior and final courts of judicature, in which also the edicts of the king were registered before they became laws. Of these the chief was that of Paris, but there were no fewer than twelve provincial parlements. These, though not actually connected with that of Paris, invariably made common cause with it in its struggles with the royal power. The parlement of Paris dated from the 14th century. Its influence grew during the 16th century, and it began to find courage to deliberate on the royal edicts as well as merely register them, which the king could always force them to do by coming in person and holding a "lit de justice." Louis XV. exiled the members from Paris in 1753 for their interference in the struggle between the Jansenists and the Jesuits, and in 1770 abolished the old parlement altogether and established the Parlement Maupeou. Louis XVI., however, recalled the former counselors.

PARLIAMENTARY PRACTICE. See *Britannica*, Vol. XVIII, pp. 311-313.

Parliamentary law is the rule of action which directs and controls the proceedings of a parliamentary body. It tends to prevent confusion, and insures despatch in the transaction of business. A deliberative assembly without binding laws would be in an anarchical condition. American parliamentary practice is different from the English. Thomas Jefferson, when he presided over the United States Senate, prepared his *Manual of Parliamentary Practice*, and the rules and principles laid down in his manual are to-day recognized by Congress "in all cases to which they are applicable and in which they are not inconsistent with other rules subsequently made."

Deliberative bodies, as the United States Congress, and the State legislatures, usually adopt rules for their own government which are adapted for their peculiar purposes. But where no such rules exist, or when questions arise to which their rules do not apply, the body is bound to obey the common parliamentary law. This law is based upon the principles of equity, and tends to give justice to the minority as well as to the majority, and also to every member of the assembly present.

METHODS OF VOTING.—*Proceedings in Deliberative Bodies*.—After the chairman has declared the assembly open for business, motions are in order. A motion is a formally worded proposition presented to the assembly for its consideration and adoption. The member offering it says: "I move," etc. The resolution which he offers commences: "Resolved," etc. The questions are decided by vote. A "vote" may be by voice—all saying *aye* or *no* in concert—or by elevating the hands, or by standing up, or by ballot. A majority vote usually decides the question.

In putting a question before the house the chairman says: "The question is on the adoption of the motion (or resolution, or amendment) which you have just heard. As many of you as are in favor of its adoption will say *Aye*." When the ayes have voted he will say: "As many as are opposed will say *No*." After voting is over, the chairman announces the result. Since he has to judge from the number of voices heard, the vote by voice is only approximate. Holding up the hands and counting the uplifted ones is more reliable. When the chair is in doubt as to his estimate of a vote by voice, he usually asks the members to rise and stand still until counted. This count decides how many votes there are for and how many against the question. This method of voting is called a *division of the house*. If a member doubts

the correctness of the chairman's estimate of a vote by voice he will rise and say: "Mr. President, I call for a division of the house." Upon this the chairman says: "A division is called for. Those in favor of the motion will rise and stand until counted." In a similar way he will take the opposing votes. In taking a division of the house, the standing members may be counted by the chairman, or the clerk, or by one or more members appointed by the chair.

Another way of voting is that of taking the *yeas* and *nays* by making each member answer when his name is called, and having his vote recorded. In Congress this mode of voting must be resorted to when the demand for it is sustained by one-fifth of the members present. Voting by ballot is usually required in the election of officers, in the admission of new members, and also when secrecy is desired. In the admission of members white and black balls, or slips of paper, are often employed. For the method of voting in both houses of the United States Congress, see the article on VOTING in these Revisions and Additions, and also RULES OF ORDER.

As a rule the chairman does not vote unless his vote would be decisive. In the United States House of Representatives the rule prevails that the Speaker "shall not be required to vote in ordinary legislative proceeding, except where his vote would be decisive, or where the House is engaged to vote by ballot."

MOTIONS AND THEIR TREATMENT.—After a motion has been presented, other motions bearing upon the same subject are in order. The first motion is then called the "main" question, the subsequent ones are subsidiary or secondary motions. The most common of the subsidiary motions is that to amend the main one. The mover wants to improve the primary motion. He offers an amendment. Then other members may move to amend his amendment. The vote on the amendment to the amendment must first be taken. Then follows the vote on the amendment, and finally on the main or original motion.

If a motion to *postpone to a certain day* is moved and carried, the question cannot be taken up before the time specified, except by a two-thirds vote. But when the day has come, the subject is entitled to be taken up in preference to everything else, except privileged questions. If a motion to *postpone indefinitely* is made and carried, the question is entirely removed from consideration for that session.

A motion to *refer* or *commit*, if adopted, takes the question from the house, and transfers it to the consideration of a committee. A motion to *re-commit* takes a subject already reported by a committee back to the same committee. All the above mentioned motions are debatable.

A motion to *lay on the table* is not debatable. If adopted, it removes the question from consideration until the House votes to take it up. This can be done at any time by a majority vote. As a rule the motion to lay on the table everything that adheres to the motion upon which it bears. Thus, if an amendment is laid on the table, it carries with it the main question.

The *previous question* is a method of cutting off debate. It is undebatable. It is equivalent to the question: Shall the discussion now cease? A member rises and says: "I move the previous question." Then the chairman puts the question before the House by saying: "Shall the main question be now put?" If the previous question is thus carried, the debate on a pending amendment or both amendment and the main question is stopped.

INCIDENTAL QUESTIONS.—There is a class of ques-

tions which is called *incidental*. These include 1, questions of order; 2, objections to the consideration of a question; 3, reading of papers; 4, withdrawal of a motion; and 5, suspension of the rules.

If anything in the procedure is against parliamentary law or the rules of the house, and a member rising, addresses the chair thus: "I rise to a point of order," the chairman will interrupt the proceedings and say: "The member will state his point of order." The member then will state his point, and the chairman thereupon will decide, whether the point is, or is not, well taken. If now any member is dissatisfied with the decision of the chair, he takes an "appeal to the house." The question then is: "Shall the decision of the chair stand as the judgment of the assembly?" An appeal to the house is debatable, except when the previous question was pending at the time when the point of order was raised. To sustain the chair does not require more than a majority vote. Even a tie vote sustains his decision.

PRIVILEGED QUESTIONS.—Some questions may be introduced at almost any time, and must be considered before any other subject that may be before the house. These privileged questions are: 1) To adjourn; 2) to fix the date to which the body shall adjourn; 3) questions of privilege; 4) a call for the order of the day.

A motion to adjourn is nearly always in order. The exceptions are these: If a motion to adjourn has just been lost, it cannot be repeated until there has been some business done or some progress in the debate made since the motion had been lost. Neither can the motion to adjourn be made while a member has the floor. But the member may give way in order that the motion may be presented. A motion to adjourn cannot be received while the yeas and nays are being called, or while the members are voting on any question, or when the previous question has been called and sustained and is still pending. The motion to adjourn cannot be debated nor amended. It supersedes all other motions, except the one to fix the date to which to adjourn. The motion to fix the time to which the adjournment will stand, when the meeting does adjourn, takes precedence of all other questions. It may be made after the meeting has voted to adjourn, as long as the chairman has not announced the result of the vote. It may be amended by changing the date of re-assembling.

The general rule as to the rank of questions is that of the United States House of Representatives, which is as follows: "When a question is under debate no motion shall be received but to fix the day to which the House shall adjourn, to adjourn, to take a recess, to lay on the table, for the previous question, . . . to postpone to a certain day, to refer or amend, or to postpone indefinitely, which several motions shall have precedence in the foregoing order."

A motion to *re-consider*, if carried, brings back before the house a question that has been decided, and places it again before the house just as it stood before the vote was taken upon it, but as the rule of the United States House of Representatives puts it, "The fact of a question having been decided under the operation of the previous question does not prevent debate on the motion to reconsider if the original question was otherwise debatable." The motion to *re-consider* may be applied to votes on all questions excepting on motions to adjourn, to suspend the rules, affirmative votes on motions to lie on the table or take from the table, on matters which have passed from the possession of the house, and on the previous question when it has

been partly executed. It may be made when other business is before the house.

DUTIES OF THE CHAIRMAN.—The chairman must recognize the member who rises first and addresses him first. No member can be deprived of his rights by the chair, as long as he is in order. But there is this exception: When the member, upon whose motion the subject on hand has been brought before the house, has not spoken on the question and asks to be heard, the chairman is bound to give him the first chance to speak. During the debate the chairman has no right to cut it off before all the members who have asked for the floor, have had their chances. When a vote has been taken and the result announced, if it appears that a member had risen and addressed the chair at the proper time, but was not recognized, even then his right to speak must be conceded, and the question voted upon will stand as though no vote had been taken.

PROCEDURE IN CONGRESS AND THE STATE LEGISLATURES.—In Congress and in the State legislatures bills are read three times. Where the legislature is a double body, consisting, for example, of a senate and a house of representatives, a bill after passing one body is sent to the other. If both bodies agree to its passage, then it is sent to the president or chief-executive for his signature. If the second body makes amendments in the bill, then, when it is returned, the house where it originated considers the amendments. If there is not agreement between the two houses, each house selects a committee of conference, and this committee endeavors to agree upon amendments which will meet the approval of both bodies. If the chief-executive vetoes the bill it is returned to the house where it originated; then, if it receives a two-thirds vote of each house, the bill becomes a law without the approval of the executive.

PARMA, a village of New York, about ten miles west of Rochester. It contains manufactories of leather, flour, and iron.

PARNAHYBA, a river of Brazil, which rises in the Serra Mangabeiras, about 9° south latitude and throughout its course (650 miles) forms the boundary between the states of Maranhão and Piahy. It enters the Atlantic by six mouths. The stream is swift, but navigable by boats for nearly 350 miles. On the east bank, fourteen miles from its mouth, is the unhealthy town of Parnahyba, with a considerable trade. Population, 8000.

PARNELL, CHARLES STEWART, an Irish patriot and statesman, is a descendant of Parnell the poet—author of *The Hermit*—and his family have been associated with Irish parliamentary life for upward of a century. His great grandfather, Sir John Parnell, was chancellor of the exchequer in Grattan's parliament, and the most vigorous opponent of the Act of Union, for his denunciation of which he was dismissed from office, he having previously resisted all efforts of the imperial government to allure him into acceptance of their proposals. The family came originally from Congleton, Cheshire; and Sir Henry Parnell, grand-uncle of Mr. Parnell, and a prominent member of the English parliament in the time of Lord Grey and Lord Melbourne, under whom he held offices of distinction, when raised to the peerage, took the title of Lord Congleton. Mr. Parnell's grandfather was William Parnell, member of parliament for Wicklow, and a political writer. His father was Charles Henry Parnell; and his mother, married May 21, 1835, is the surviving daughter of Charles Stewart—"Old Ironsides"—a distinguished rear admiral of the United States navy. Charles Stewart Parnell was born at Avondale, County Wicklow, Ireland, June 23, 1846; educated principally under private masters; and was

for some time a member of Magdalene College, Cambridge. After a tour of the United States he settled down on his property at Avondale.

In 1874 he became high-sheriff of county Wicklow; next year he contested county Dublin without success; but in April, 1875, was returned as an avowed Home Ruler for county Meath. He took an active part in parliamentary affairs, and in association with Mr. Biggar he initiated what was known by the various names of the "obstructive" and the "active" policy. He opposed with great persistence the bill for annexing the Transvaal; the flogging clauses in the Mutiny Act, and the Prisons Bill; and there were many scenes of violence and excitement, and several all-night sittings of the house. He finally succeeded in getting some modifications in the treatment of political prisoners introduced into the Prisons Bill; and being joined by Mr. Chamberlain and other leading Radicals, he led to the abolition of flogging in the army. He now threw himself with energy into the agrarian agitation, joined Michael Davitt in the foundation of the Land League, and in October, 1879, was elected its first president. He first, at a meeting at Westport in the previous June, used the phrase, "Keep a firm grip of your homesteads," which became the watchword of the agitation. He went to America in December, 1879, raised the sum of \$350,000 in aid of the distress then widespread in Ireland, and for the Land League movement. At the general election of 1880 he was elected for county Meath, county Mayo, and the city of Cork; and elected to sit for the last mentioned place. He was elected in May, 1880, leader of the new party. He took an active part in the Land League agitation outside parliament, and in the debates in the house; and after the Land Act was passed was arrested in October, 1881, on a charge of intimidation and obstructing the working of that act. He was released on parole in April, and finally in May, 1882. Already the Land League had been proclaimed as an illegal association after the issue of the "no rent" manifesto, but early in 1884 the Nationalists succeeded in reviving it under the name of the National League and Mr. Parnell was elected its president. At the general election of 1885 he was reelected for Cork, and his action in influencing the Irish vote secured the return of many Conservative candidates, and proportionally weakened the Liberal party, with whom, however, Mr. Parnell later on formed an alliance, and by the vote of the Irish party overthrew the former government of Lord Salisbury on Mr. Jesse Collings' amendment to the address, Jan. 26, 1886.

Mr. Parnell's name came prominently before the public in connection with the home rule proposals of Mr. Gladstone, whose views on this question had by this time undergone a complete change. Mr. Parnell introduced a land bill in the beginning of 1887 which was rejected, though its leading provisions with modifications were subsequently embodied in the government's own measure. Later in the session a sensation was caused by the publication in the "Times" newspaper of the facsimile of a letter purporting to have been written by Mr. Parnell to a member of the party of Irish invincibles, excusing the murder of Mr. Burke, though regretting that of Lord Frederick Cavendish. On the night of the publication of this document Mr. Parnell returned to the house of commons, from which he had been absent, and in an animated speech denounced the letter as a base and infamous forgery. Subsequently, on a motion of Sir Charles Lewis—which, though demanding that the publisher of the "Times" should be brought to the house, was not framed in the interests of the Irish

party—the prominent Irish members demanded that the question of the authenticity of the letter should be investigated by a committee of the house of commons, composed, if the house thought fit, entirely of conservative members. The government declined to grant a committee, but promised that if Mr. Parnell liked to take action against the "Times" he should have the assistance of the law officers of the crown—a proposal which was treated with ridicule by the Irish members and their friends. Mr. Parnell refused to bring an action for libel on account of the alleged forgeries and the charges of complicity with assassins, brought against him and his associates in the series of articles published by the "Times" under the title of "Parnellism and Crime," because he had no confidence in a Middlesex jury. After the collapse of an action brought against the "Times" in May, 1888, by Mr. Frank Hugh O'Donnell, a former colleague, at which other damaging letters were put in by the attorney-general, Mr. Parnell again demanded a parliamentary inquiry, and alleged that these other letters were also forgeries. The government refused to grant a committee of the house on a question of privilege, but decided that the whole of the charges against Mr. Parnell and the Irish party should be investigated by a commission of judges, consisting of Sir James Hannen, Mr. Justice Smith, and Mr. Justice Day. Mr. Parnell was represented at the commission by Sir Charles Russell, Q. C., M. P., who delivered a most eloquent oration, and by Mr. H. H. Asquith, M. P. The inquiry occupied 128 days. Its principal event was the breakdown under cross-examination, and the flight and suicide at Madrid, of Pigott, the forger of the letters and the principal witness for the "Times;" and the result of the investigation was that Mr. Parnell was cleared of the charge of having been guilty of organizing outrages. He sought to bring an action for damages against the "Times" in Edinburgh, but Lord Kinnear held there was no jurisdiction. He was presented with the freedom of Edinburgh, July 30, 1889, and was present at a large meeting in the Corn Exchange, when an address by 146 liberal associations was presented to him. In November, 1890, shortly after a grand banquet given to Mr. Parnell on his forty-fourth birthday, his friends were saddened by the announcement that he had been condemned in costs as co-respondent in the divorce case of O'Shea v. O'Shea, and that Mr. Gladstone had demanded his deposition. The Irish parliamentary party met, however, and reelected him to the leadership; but later, forty-four members withdrew and declared for Justin McCarthy. He died in 1891.

PAROLE, the declaration made on honor by an officer, in a case in which there is no more than his sense of honor to restrain him from breaking his word. Thus, a prisoner of war may be released from actual prison on his parole that he will not go beyond certain designated limits; or he may even be allowed to return to his own country on his parole not to fight again, during the existing war, against his captors. To break parole is accounted infamous in all civilized nations, and an officer who has so far forgotten his position as a gentleman ceases to have any claim to the treatment of an honorable man, nor can he expect quarter should he again fall into the hands of the enemy he has deceived.

PARRAKEET, or PARROQUET, a name commonly given to many of the smaller species of the parrot family. One of the species, the Zebra parrakeet (*Melopsittacus undulatus*), is very beautiful, and in the vast inland plains of Australia is to be seen in flocks of many hundreds feeding on the seeds of

the grasses, which afford food also to many other smaller species.

PARRETT, WILLIAM F., an American lawyer and statesman, born in Indiana in 1825. He was raised on a farm, studied law, and was admitted to the bar about 1847; practiced in Indiana and Oregon; held various positions of trust; was circuit judge in Indiana for many years; and was elected to Congress in 1889.

PARRICIDE, rather a popular than a legal term. In the Roman law it comprehended every one who murdered a near relative; but in English the term is usually confined to the murderer of one's father, or of one who is *in loco parentis*. In the Roman law a parricide was sewed up in a leather sack, along with a live cock, viper, dog and ape, and cast into the sea.

PARRISH, EDWARD (1822-72), an American pharmacist, member of a family of distinguished physicians, connected for many years with Philadelphia, and best known through "Parrish's Chemical Food." This is the popular name for a non-official preparation medicinally known as *Compound Syrup of Phosphate of Iron*, every drachm of which contains 1 grain of phosphate of iron, $2\frac{1}{2}$ of phosphate of lime, besides soda and potash.

PARROTT, ROBERT PARKER, an American inventor, born in New Hampshire in 1804, died at Cold Spring, N. Y., in 1877. He graduated at West Point in 1824, and was lieutenant of artillery until 1836, when he became superintendent of the iron and cannon foundry at Cold Spring, N. Y. He is known as the inventor of the Parrott system of rifled guns and their projectiles.

PARSLEY (*Petroselinum*), a genus of plants of the natural order *Umbelliferae*. The species are annual or biennial, branching, smooth, herbaceous plants, with variously pinnated leaves. Common Parsley (*P. sativum*), which has tripinnate shining leaves, one of our best-known culinary plants, is a native of the south of Europe, growing chiefly on rocks and old walls. The cultivation of parsley is extremely simple, seed requiring to be sown annually to keep up a constant supply. A variety with curled leaflets is generally preferred to the common kind with plain leaflets, as finer and more beautiful, being often used as a garnish. *Hamburg Parsley* is a variety with a large white carrot-like root, cultivated for the sake of its root, and much in the same way as the carrot or parsnip. To produce large roots and of delicate flavor a very rich soil is required. The foliage of parsley is not merely of use for flavoring soups, etc., but is nutritious at the same time that it is stimulating, a quality which it seems to derive from an essential oil present in every part of the plant. Parsley contains also a peculiar gelatinous substance called *Apiine*. The bruised leaves of parsley are sometimes employed as a stimulating poultice. The seeds are deadly poison to many birds, and when powdered they are sometimes used for killing lice.

PARSNIP (*Pastinaca*), a genus of plants of the natural order *Umbelliferae*, having compound umbels with neither general nor partial involucre; yellow flowers, with roundish, involute, sharp-pointed petals; calyx almost without teeth; fruit dorsally compressed and flat, with a broad border, the ridges very fine. The species are annual, biennial, or perennial herbs, with carrot-like, often fleshy roots and pinnate leaves. The common parsnip (*P. sativa*) is a native of England, and was brought to America by English navigators, and planted here by the Indians prior to the date of white settlement. In recent times selections of the wild plant have been made, which by cultivation for a period of ten years have developed vari-

eties of superior excellence. The parsnip is now cultivated for the sake of its root, which in cultivation has greatly increased in size and become more fleshy. The flavor is disliked by some, as well as the too great sweetness, but highly relished by others; and the root of the parsnip is more nutritious than that of the carrot. The produce is also on many soils of larger quantity; and although the parsnip delights in a very open rich soil, it will succeed in clayey soils far too stiff for the carrot. It is rather remarkable that it has not been more extensively cultivated as a field-crop and for the feeding of cattle, especially as cattle are very fond of it; and not only is the flesh of cattle fed on it of excellent quality, but the butter of dairy cows fed on parsnips in winter is said to be superior to that produced by almost any other kind of winter-feeding. The mode of cultivation of the parsnip scarcely differs from that of the carrot. There are several varieties in cultivation. A very large variety called *coquaine*, cultivated on deep sandy soils, has roots sometimes three or four feet long; but this is fully twice the ordinary length, and there is a smaller turnip-rooted variety sometimes cultivated in gardens where the soil is very shallow. The parsnip is used chiefly in winter, whether for the table or for feeding cattle. It is improved rather than injured by frost, but is apt to become *rusty* if allowed to remain too long in the ground, and exhibits acrid qualities after it has begun to grow again in the spring. The root of the parsnip is much used in the north of Ireland for making a fermented liquor with yeast and hops, and both in England and Ireland for making *parsnip wine*. A spirit is also obtained from it similar to that of the potato.

PARSONS, a city of Kansas, about thirty-five miles south of Humboldt. It is an important railroad center, and contains machine-shops and manufacturing of plows, furniture, pottery and tiles. Population in 1890, 6,736.

PARSONS, a borough of Pennsylvania, about three miles northwest of Wilkesbarre. It has several collieries.

PARSONS, SAMUEL HOLDEN, an American general, born in Connecticut in 1737, drowned in Ohio in 1789. He held many colonial offices, served with distinction throughout the Revolution; and was afterwards appointed to responsible positions in connection with Indian affairs; was first judge of the Northwest Territory; and published valuable papers on American antiquities.

PARSONS, THEOPHILUS, an American jurist, born in Massachusetts in 1750, died in 1818. He held many responsible positions, and was chief-justice of the supreme judicial court from 1806 until his death. His decisions are famous. His son, THEOPHILUS PARSONS (1807-1882), was also an eminent jurist and a voluminous writer of legal and theological works.

PARTICK, a town of Scotland, prettily situated, chiefly on a rising ground on the Kelvin, immediately above its junction with the Clyde, and three miles northwest of the Cross of Glasgow, of which city it now forms a suburb. Nine-tenths of the workmen of Partick are engaged in shipbuilding-yards, but there are also many flour-mills, cotton-factories, and bleach-fields. Population, 27,410.

PARTNERSHIP. See *Britannica*, Vol. XVIII, pp. 329-332. Every association of two or more persons for the purpose of doing business on joint or undivided account is a partnership. As a rule, the term is only applied to un-incorporated business associations. A partnership may be constituted either by the respective persons contributing capital or skill, or one or more furnishing capital and

others skill. Thus, lawyers in partnership may furnish no capital; members of a mercantile firm may all contribute capital; while some may supply capital and others skill.

PARTNERSHIP-CONTRACT, ITS NATURE AND RELATION TO REAL ESTATE. The general principles of law governing contracts are to be extended to the relation of persons in partnership with each other. Persons entering into partnership must not be incapacitated to enter into this contract, that is, they must not be minors, or imbeciles, or under duress, etc. The capital of a mercantile partnership usually consists of personal property, though there may also be real estate and for the purposes of the partnership. The question may arise, whether this land is to be governed by the technical rules applying to real estate, or by those which prevail in the law of personal property. If a partner dies, his widow can have no dower in this land, nor can his heirs inherit, until all the partnership debts are paid and the joint affairs are fully settled. After this the widow can have her dower and the heirs can inherit.

The "good will" of a partnership is often an important part of its assets. This is the expectation that customers will continue to resort to the place where the business is transacted. The good will is property of a peculiar kind. It cannot be sold by a sheriff on an execution, as it is in its nature intangible. When one of the partners dies, his executor can only realize something from this source by selling the stock and premises together. In this case the good will goes naturally with the sale of the premises.

Partners are classified into secret, dormant, nominal and ostensible. A "dormant" partner is one who supplies capital but takes no active part in the management. A "secret" partner is one who is not known as a partner, though he may be active in the interest of the concern. A "nominal" or "quasi" partner is one who has no real connection with the firm, but holds himself out as a partner. Persons who give credit to the firm on the faith of his name, may hold him liable on the ground of estoppel.

In some of the States there is a partnership known as limited. In a "limited" partnership no liability is incurred by the members beyond the amount of their subscription. It is in the nature of a corporation. "Joint-stock companies" are partnerships consisting of a large number of persons whose liability is usually that of a general partner. Holding land in partnership by speculators is recognized as true partnership, but farming land on shares has been held to be no partnership.

EFFECTS OF PARTNERSHIPS ON THIRD PERSONS AND BETWEEN THE PARTNERS THEMSELVES.—One who merely lends his name to a firm (nominal partner) is liable to those who have acted upon the supposition that he was in fact a partner. He may directly assert his partnership, or he may give the firm permission to use his name over the shop-door or in printed notices, bills, advertisements, etc.—in all cases he will be estopped from denying his liability as a partner, even if he has no share whatever in the firm. It is essential, however, that this holding himself out as a partner should have been prior to the contract with the third person, as well as the inducement to it.

A point of interest in partnership law is the capacity of one member of a firm to bind his associates in respect to third persons. The partnership liability rests upon the participation in the profits; because whenever a person takes by agreement a share of the profits of a firm, he withdraws a por-

tion of the funds to which the creditors of the firm had a right to look for re-imbursement. He should accordingly be held liable to the creditors. This is the doctrine laid down in a celebrated early English case (*Waugh vs. Carver*), which has been quite generally followed in the courts of the United States. The New York court of appeal has lately re-affirmed (*Leggett vs. Hyde*) the correctness of this theory, and makes the participation of profits the basis of partnership.

If a partner gives a promissory note, and signs the firm name without the consent of his associates, and this note is taken up before maturity in the regular course of business by a purchaser in good faith, the latter can collect the note from the firm, notwithstanding the partner who has executed the note, has no right whatever to bind the firm by such a note. The ground of this rule is, that the partner issuing the note had the "apparent authority" to issue it, and that a third party could not possibly distinguish this note from others which the partner has a real right to issue. If, however, the purchaser of the note knew, or had reasons to know, that the partner was violating his duty, the firm will not be liable for the note.

Owing to the intimate relations between partners the act of one is for many purposes the act of all. Notice to one of any fact touching their common business is notice to all. An admission made by one is supposed to be made by all. Such an admission, if it affects their common interests, is receivable in evidence. If one of the partners commits a wrongful act (tort), or commits a fraud, in connection with the common business, all of them are answerable for it. The liability ceases when the wrongful act is wholly unconnected with the partnership business.

The relation of partners between themselves is largely based on trust and confidence. This view prevents each one from doing any act without the partners' consent in reference to the firm business, which shall inure to his own advantage. Thus, if he buys up a claim against the firm for less than its face value, he can only charge to the firm what he actually paid. If he take from a landlord, in his own name, a renewal of a valuable lease belonging to the firm, he will be obliged to account as a trustee for the profits which may accrue.

DISSOLUTION OF PARTNERSHIP—A partnership may be dissolved in a number of ways. The leading modes are:

- a. The express consent of the parties.
- b. The sale by one of his interest.
- c. Death of one or more members.
- d. Bankruptcy.
- e. Marriage of a female partner.
- f. Insanity legally established.
- g. The fact that one becomes by the law of nations an enemy of his associates.
- h. The action of a court of equity decreeing a dissolution on such grounds as, that the ends sought to be accomplished are impracticable; or that one of the firm is so conducting himself as to bring disaster upon the common interests; or is in such a state of mind that he cannot contribute to the common advantage, etc.

i. The voluntary withdrawal of a member.

The effect of the dissolution is to prevent any new contracts from being made. It only remains to pay outstanding debts, and to close existing transactions. Actual notice of dissolution must be brought home to persons who have been in the habit of dealing with the firm, with regard to persons who have had no previous dealings with the firm, notice in the newspapers is sufficient. This notice is necessary to terminate the agency of each

partner and his powers and liabilities as such. When the dissolution takes place by operation of law, or by the death of a partner, notice is not necessary.

PARTON, JAMES, a distinguished American biographer, born in England in 1822. He was educated at White Plains, N. Y., taught school; became an editor; produced his *Biography of Horace Greeley*, in 1855, and other valuable biographies in rapid succession. His wife, Sarah Payton Parton, sister of N. P. Willis, well known by her pen name of "Fanny Fern," was born in Maine in 1811, and died in 1872.

PARTRIDGE. See *Britannica*, Vol. XVIII, pp. 332-3. The commonest kinds of partridges are the



PARTRIDGE.

gray ones and the red-legged ones. The first lives in England and the second in France. Of the birds called partridges in this country we mention (1) the ruffed grouse (*Bonasa umbellus*), and (2) the bob-white (*Ortyx virginianus*), a kind of quail. The first is found in the Eastern States and the second in Virginia and other States. In the Middle and Southern States the bob-white is called pheasant. In the West there is the pinnated grouse, called prairie-hen (*Cupidonia cupido*), the sharp-tailed grouse (*Pediacetes columbianus*), the sage-grouse (*Centrocercus urophasianus*), the dusky grouse (*Canace obscurus*), and several others. All of these are small gallinaceous game-birds with naked and scaly tarsi, and are often called partridges.

PARTRIDGE-WOOD, a very pretty hardwood from the West Indies and Brazil; the product of the leguminous tree *Andira inermis*.

PASADENA, a pretty country town in southern California, ten miles east of Los Angeles. It has a great hotel with accommodation for 500 people and a population of about 12,000.

PASCAGOULA, a navigable river in the southeastern part of Mississippi, formed by the junction of the Leaf and Chickasawha. It flows eighty-five miles south to a small bay of the same name on the Gulf of Mexico.

PASCO, SAMUEL, an American statesman, born in London, England. He removed with his father to Prince Edward Island; thence to Massachusetts; was prepared for College in Charlestown, and graduated at Harvard in 1858; in 1859 he went to Florida to take charge of the Waukeenh Academy; in 1861 he entered the Confederate Army as a private; at the close of the war became clerk of the Circuit Court of his county; was admitted to the bar in 1868; in 1872 became a member of the Democratic state committee, and from 1876 to 1888 was its chairman: in 1880 was elected a Presidential

elector at large; in 1885 was president of the constitutional convention of his State; in 1887, while speaker of the State house of representatives, he was elected to the United States Senate. His term of service will expire in 1893.

PASCOAG, a village of Rhode Island, about twenty-four miles west of Providence. It contains many woolen mills and other manufactories.

PASEWALK, a town of Prussia, twenty-six miles northwest of Stettin. It was plundered and burned three times by the Imperialists in the Thirty Years' War, by the Poles in 1667, and by the Russians in 1713. Population, 9,514.

PASHÁ (spelt also *pacha* and *bashaw*), a title derived from the Persian, used in the Ottoman empire, and applied to governors of provinces, or military and naval commanders of high rank. The three grades of pashas used to be distinguished by the number of the horse-tails—three, two or one—borne before them as their standards. This antique system was abolished by Mahmud II., but the three ranks still survive.

PASSAGLIA, CARLO, a Catholic theologian, born of humble parents at Lucca, May 2, 1812, died at Turin, March 12, 1887. He was trained a Jesuit, and in 1844 became professor in the College Romano. He was eminent alike for his learning and eloquence. In 1855 he published an elaborate treatise on the doctrine of the Immaculate Conception, but ere long he resigned his chair, and in 1859, leaving the Society of the Jesuits, entered warmly into the discussions as to the temporal power of the Pope, and wrote a famous pamphlet, *Pro Causa Italica ad Episcopos Italianos*. The result was that he had to withdraw to Turin, where he edited the *Mediatore* and became professor of Moral Philosophy.

PASSAIC, a city of New Jersey, on the Passaic River, eleven miles by rail northwest of Jersey City. It has foundries and print-works, manufactories of woollens and shoddy, whips, india-rubber, and chemicals. Population, 1890, 13,028.

PASS CHRISTIAN, a village of Mississippi, on Mississippi Sound, about sixty miles east of New Orleans. It is the seat of Pass Christian College.

PASSIONISTS, a religious congregation of priests of the Roman Catholic church, the object of whose institute, indicated by their name, is to preach "Jesus Christ and Him crucified." The founder, St. Paul of the Cross, was born in 1694 near Genoa, obtained the sanction of Benedict XIV. in 1741, and died at the mother-house of the society on the Celian Hill at Rome in 1775. The cross appears everywhere as their emblem, and a large crucifix forms a part of their very striking costume. For a time the congregation remained in obscurity; but in the first half of the 19th century it rose into notice. In 1842 it secured a footing in England. The American province, begun in 1852, numbers between one hundred and two hundred religious houses.

PASSOVER, see **TABERNACLE** in these Revisions and Additions.

PASSOW, FRANZ, a German scholar, born at Ludwigslust in Mecklenburg, Sept. 20, 1786, died March 11, 1883. He was educated at Gotha and Leipzig, and in 1815 became professor of Archæology at Breslau, in 1829 director also of the museum of art there. His *Handwörterbuch der griechischen Sprache* is the work that preserves his memory, and formed the basis of Liddell and Scott's *Greek Lexicon*.

PASSPORT REGULATIONS OF THE UNITED STATES. Persons from other countries traveling in the United States need no passport. Citizens of

this country, who desire passports preparatory to travel in any country abroad, can obtain such passports by making application to the proper Government officer. Such application must be accompanied by proof of citizenship.

When the applicant is a native citizen of the United States he must transmit his own affidavit of this fact, stating his age and place of birth, with the certificate of one other citizen of the United States to whom he is personally known, stating that the declaration made by the applicant is true. The affidavit must be attested to by a notary public under his signature and seal of office. When there is no notary in the place the affidavit may be made before a justice of the peace or other officer authorized to administer oaths; but if he has no seal, his official act must be authenticated by certificate of a court of record.

A person born abroad who claims that his father was a native citizen of the United States must state in his affidavit that his father was born in the United States, has resided therein, and was a citizen of the same at the time of the applicant's birth. This affidavit must be supported by that of one other citizen acquainted with the facts.

NATURALIZED CITIZENS.—If the applicant be a naturalized citizen, his certificate of naturalization must be transmitted for inspection (it will be returned with the passport), and he must state in his affidavit that he is the identical person described in the certificate presented. Passports cannot be issued to aliens who have only declared their intention to become citizens.

Every applicant is required to state his occupation and the place of his permanent legal residence, and declare that he goes abroad for temporary sojourn and intends to return to the United States with the purpose of residing and performing the duties of citizenship therein.

The wife or widow of a naturalized citizen must transmit the naturalization certificate of the husband, stating in her affidavit that she is the wife or widow of the person described therein. The children of a naturalized citizen, claiming citizenship through the father, must transmit the certificate of naturalization of the father, stating in their affidavits that they are children of the person described therein, and were minors at the time of such naturalization.

The oath of allegiance to the United States will be required in all cases.

APPLICATION.—The application should be accompanied by a description of the person, stating the following particulars—viz.: Age: — years. Stature: — feet, — inches (English measure). Forehead: —. Eyes: —. Nose: —. Mouth: —. Chin: —. Hair: —. Complexion: —. Face: —.

If the applicant is to be accompanied by his wife, minor children or servants, it will be sufficient to state the names and ages of such persons and their relationship to the applicant, when a single passport for the whole will suffice. For any other person in the party a separate passport will be required. A woman's passport may include her minor children and servants.

FEE REQUIRED.—By act of Congress approved March 23, 1888, a fee of one dollar is required to be collected for every citizen's passport. That amount in currency or postal note should accompany each application. Orders should be payable to the disbursing clerk of the Department of State. Drafts or checks are inconvenient and undesirable.

TERMINAL AND RENEWAL.—A passport is good for two years from its date and no longer. A new one may be obtained by stating the date and number

of the old one, paying the fee of one dollar, and furnishing satisfactory evidence that the applicant is at the time within the United States. The oath of allegiance must also be transmitted when the former passport was issued prior to 1861.

Citizens of the United States desiring to obtain passports while in a foreign country must apply to the chief diplomatic Representative of the United States in that country, or, in the absence of a diplomatic representative, then to the consul-general, if there be one, or in the absence of both the officers last named, to a consul. Passports cannot be lawfully issued by State authorities, or by judicial or municipal functionaries of the United States. (Revised Statutes, §4075.)

To persons wishing to obtain passports for themselves, blank forms of application will be furnished by this department on request, stating whether the applicant be a native or naturalized citizen, or claims citizenship through naturalization of husband or parent. Forms are not furnished except as samples, to those who make a business of procuring passports.

Communications should be addressed to the Department of State, indorsed "Passport Division," and each communication should give the post-office address of the person to whom the answer is to be directed. Professional titles will not be inserted in passports.

Persons applying to the department for forms should in all cases state if for *native* or *naturalized* citizens.

PASSPORTS REQUIRED.—Passports are necessary for the Turkish dominions, including Egypt and Palestine, and must be certified by a Turkish consular officer before entering Turkish jurisdiction. Persons quitting the United States with eventual purpose of visiting any part of Turkey, are advised that their passports may conveniently be certified in advance by the consul-general of Turkey at New York, thus avoiding possible difficulty in obtaining the prescribed *visa* in another country *en route*.

Persons traveling with United States passports desirous of entering Germany from France should not neglect to have their passports viséed by the consul-general of Germany at Paris, thus possibly sparing themselves much inconvenience and delay.

It is also understood that in many of the larger cities of Germany passports are required of all foreigners who therein take up even a short residence.

PASTA, GIUDITTA, an Italian opera singer, born of Jewish parents, Negri by name, at Como near Milan, April 9, 1798, died April 1, 1865. She received her musical education at Como and in the conservatoire at Milan. She had a magnificent voice, which passed easily from the highest soprano notes to the gravest contralto tones; and she possessed fine dramatic power. *La Sonnambula* was written for her by Bellini.

PASTEL, chalk mixed with other materials and various colors, and formed into pencils or crayons. Drawings with such dry, colored crayons may be made on paper or parchment, and have been especially used in portraiture.

PASTEUR, Louis, an eminent French chemist and pathologist, distinguished for his discoveries in bacteriology, born at Dôle, in the department of Jura, Dec. 27, 1822. He studied at Arbois, at Besançon, and at the Ecole Normale and the Sorbonne in Paris. He became professor at Dijon in 1848; at Strasburg in 1849; at Lille in 1854, and at Paris in 1857, where the centre of his labors has been at the Ecole Normale, at the Sorbonne, and at the Pasteur Institute, which was formally opened

in 1888. His work was at first chemical. Following up well-known researches by Arago, Biot and Mitscherlich, he discovered the facets on tartrate crystals and what are called left-handed tartrates. He also propounded the theory that "molecular dissymmetry"—supposed to be expressed in the power which solutions of some organic substances have of causing a beam of polarised light to rotate—was characteristic of living matter and its products. It is said that a German manufacturer of chemicals noticed that impure tartrate of lime fermented when dissolved and exposed in the sun, and that this prompted Pasteur to an investigation, the result of which was the discovery of a living ferment—a micro-organism comparable in its powers to the yeast-lant which Cagniard-Latour and Schwann had discovered in alcoholic fermentation. Pasteur was further able to show that the little organism would, in a solution of paratartrate of ammonia, select for food the "right-handed" tartrates alone, leaving the "left-handed," although the difference between these is merely physical, not chemical. Having got hold of a clue, Pasteur went on to show that other fermentations—lactic, butyric, ascetic—are essentially due to organisms. He was naturally led to corroborate and extend Schwann's researches on putrefaction, which is also due to micro-organisms, and this path of investigation enabled him to make important practical suggestions in regard to the making of vinegar and the prevention of wine disease, as also to correct insufficiently careful experiments which were leading many to believe that spontaneous generation was demonstrable. Prompted by his illustrious master Dumas, Pasteur next directed his inquiries to those diseases of silkworms by which the silk industry in France had been almost ruined. It is said that he had never before even seen a silkworm, though he knew the supposed disease germs which had been demonstrated by previous investigations in the insect's blood. These he traced from egg to larva, from chrysalis to moth; and, as the pébrine disease is distinctly manifest in the adults, though it may be hidden in the young, the practical conclusion is plain that unhealthy moths should be rejected, and that all precautions should be taken to prevent infection. But Pasteur's work on the diseases of silkworms overstrained him, and in 1868 he was laid aside by paralysis. Soon, however, he was at work again, investigating beer as he had investigated wine, detecting the intruders which sometimes interfere with the life of the yeast-plant and spoil the brew. His researches began to come yet closer to human life, for he attacked the problem of splenic fever, the bacillus of which had been discovered by Davaine and skillfully traced from stage to stage by Koch. Of Pasteur's investigations in this connection, that by which he showed that birds were not liable to fall victims to splenic fever, because the temperature of their blood is too high for the prosperity of the germ, may serve as a characteristic illustrations. Passing from splenic fever to fowl cholera, he showed that it was possible to attenuate the virulence of injurious micro-organisms by exposure to air, by variety of culture, or by transmission through various animals. He thus "tamed" the bacillus of splenic fever, and demonstrated by a memorable experiment that sheep and cows "vaccinated" with the attenuated bacilli were protected from the evil results of a subsequent inoculation with the virulent virus. Pasteur's subsequent researches in regard to hydrophobia are discussed in the article on that subject in these Revisions and Additions. See also the articles there referred to in the *Britannica*.

PASTORAL EPISTLES. See *Britannica*, Vol. XVIII., pp. 348-51.

PASTORAL POETRY, poetry which professes to delineate the scenes and incidents of shepherd life. As an attempt to realize an imaginary and highly idealized state of society it is a completely artificial form, and it has already disappeared from literature, never to be revived. The delightful Dorsetshire poems of Barnes exhibit the only natural method in which pastoral society can give subjects to modern poetic art. The pastorals of our modern literatures are essentially a humanistic revival of the Greek *idyl* of Theocritus, Bion, and Moschus, and the Latin *eclogue* of Virgil, and first made their appearance in Tuscany in the 16th century. The earliest dramatic pastoral is the *Favola di Orfeo* of Politian, performed at the court of Mantua in 1472, but the first complete pastoral was Agostino Beccari's comedy, *Il Sacrificio*, played at Ferrara in 1554. Its finest and most famous successors were the *Aminta* of Tasso, represented at the court of Ferrara in 1573, and Guarini's *Pastor Fido*. The earliest non-dramatic pastoral was G. Sannazaro's *Arcadia* (1504), which through Sidney's famous romance with the same title exercised a great influence upon English literature.

PASTORAL THEOLOGY, that branch of theological science which regards the duties and obligations of pastors in relation to the care of souls.

PATCHES. During the whole of the 17th and beginning of the 18th century these fantastic ornaments were commonly worn by women and sometimes by men. In 1650 a bill against "painting, black patches and immodest dresses" was read for the first time, but got no further. The senseless custom was still rife when (1712) Pope described among the treasures of Belinda's toilet-table "Puffs, powders, patches, Bibles, billet-doux" (*Rape of the Lock*, i. 138). Attempts have been made to revive the fashion with but partial success.

PATCHAGUE, a village of New York, on the southern shore of Long Island, about fifty-five miles east of New York City. It produces a variety of manufactures and has a large trade in fish and oysters.

PATCHOULI, a perfume derived from the dried branches of *Pogostemon patchouli*, first introduced as an article of merchandise in 1844. The plant, a low shrub 2½ or 3 feet high, is a native of Silhet, the Malay coast, Ceylon, Java, the neighborhood of Bombay, and probably also of China. Every part of the plant is odoriferous, but the younger portions of the branches with the leaves are chosen. The odor is very powerful, and to many persons is extremely disagreeable. The odor of patchouli was known in Europe before the material itself was introduced, in consequence of its use in Cashmere to scent the shawls with a view of keeping out moths; hence the genuine Cashmere shawls were known by their scent, until the French found the secret, and imported the herb for use in the same way. In India it is used as an ingredient in fancy tobaccos and as a perfume for the hair. It is also much prized for keeping insects from linen and woolen articles. The essence of patchouli is a peculiar heavy brown oil, with a disagreeably powerful odor; it is obtained by distillation, and requires extreme dilution for perfumery purposes.

PATEN (Lat. *patina*, "a dish"), a small circular plate employed for the wafers or bread in the eucharist service. It is always of the same material as the chalice, often richly chased or carved, and studded with precious stones.

PATER, WALTER, born in London, August 4, 1839. He was educated at King's School, Canterbury, and at Queen's College, Oxford, taking a

classical second-class in 1862. He was elected to an open fellowship at Brasenose; has traveled in Italy, France and Germany; and has earned his rank among the best prose-writers of his time. His books are *Studies in the History of the Renaissance*; *Marius the Epicurean: his Sensations and Ideas*, an imaginary biography of a young man brought up in Roman paganism, who passes through varied spiritual experiences, meets Marcus Aurelius himself, and at last, shortly before his unexpected death, makes acquaintance with the mysterious new eastern religion, yet without being profoundly influenced by it; *Imaginary Portraits of Watteau*, *Denys l'Auxerrois*, *Sebastian van Storck*, and *Duke Carl*; and *Appreciations*, a volume of admirable criticism on Charles Lamb, Wordsworth, Coleridge, Rossetti, Sir Thomas Browne, Blake, and on Style itself.

PATEREROS, small pieces of ordnance, now obsolete, worked on swivels; most commonly used on board ships, where they were mounted on the gun-wale, and discharged showers of old nails, etc., into hostile boats.

PATERSON, a city, the county-seat of Passaic county, N. J., on the Passaic River, seventeen miles northwest of New York City. Population in 1890, 78,368. See *Britannica*, Vol. XVIII, p. 359.

PATMORE, COVENTRY KEARSEY DEIGHTON, poet, born at Woodford, England, July 23, 1823, the son of P. G. Patmore, author of *Literary Reminiscences*. He published a volume of *Poems* in 1844, and three years later joined the staff of librarians in the British museum, where he remained till 1868. Soon after he settled at Hastings, where he built a large Catholic church. His second volume of poems, *Tamerton Church Tower*, etc., prepared the way for his greatest work, *The Angel of the House*, an exquisite and sincere poem of love from the domestic side, which has had a great popularity.

Patmore edited the anthology entitled *The Children's Garland*; the *Autobiography* of Barry Cornwall, and the posthumous poems of his son, Henry Patmore, *Horilegium Amantis*, a selection from his poems, was published in 1888.

PATON, JOHN GIBSON, missionary to the New Hebrides, the son of a stocking-maker, born in the parish of Kirkmahoe, Scotland, May 24, 1824. After some experience in Glasgow City Mission, he offered his services for the foreign mission field in connection with the Reformed Presbyterian Church, and on his ordination he settled down towards the end of 1858 amongst the cannibal natives of Tanna. Here he labored amidst trials and difficulties till 1862, when he was forced to leave, owing to the hostility of the natives. For the next twenty years his work was on the neighboring island of Aniwa, the whole population of which became Christian. Both by voice and pen he afterwards attracted public attention and sympathy towards this field of mission labor; and his brother published and edited his graphic and thrilling missionary narratives in 1890. In 1891 he was made a D. D. of Edinburgh.

PATON, SIR JOSEPH NOEL, a Scotch painter, born in Dunfermline, Dec. 13, 1821, and studied for a time at the Royal Academy, London. His cartoon sketch, *The Spirit of Religion*, gained one of the three premiums at the Westminster Hall competition in 1845. Two years thereafter his oil-picture of *Christ bearing the Cross and his Reconciliation of Oberon and Titania*, jointly gained the prize of \$1,500. *Dante Meditating the Episode of Francesca* was exhibited in Edinburgh in 1862; the *Dead Lady*, in 1854, and *The Pursuit of Pleasure* in 1855. Scenes from fairyland and from ancient legend, and religious and mystical allegory, painted with grace, tenderness,

and something of over-refinement, have made his work familiar, and have been often engraved. Among his other pictures *Home from the Crimea*; *In Memoriam* a scene from the Indian Mutiny, and a series of six pictures-illustrations of the *Dowie Dens o' Yarrow*. He has illustrated Aytoun's *Lays of the Scottish Cavaliers*, and in 1864 he executed twenty illustrations of the *Ancient Mariner*. He has published two volumes of poems.

PATRICK, MARSENA R., a distinguished American general, born in Houndsfield, N. Y., in 1811, died in 1888. He graduated at West Point; served in the Florida and Mexican wars; resigned, became a farmer, and was president of the Agricultural College and superintendent of the New York State Agricultural Society. During the civil war he was inspector-general of New York; brigadier-general; provost-marshal-general of the army of the Potomac, and later of the combined armies before Richmond. After the war he was again president of the State Agricultural Society.

PATRONS OF HUSBANDRY, See GRANGERS in these Revisions and Additions.

PATTERSON, CARLILE POLLOCK, an American naval commander and engineer, son of Daniel Tod Patterson of the United States Navy, born in Mississippi in 1816, died in 1881. He served in the Mediterranean; studied civil engineering, and joined the coast survey about 1838; went into business on the Pacific coast in 1853; was appointed hydrographic inspector of the Coast Survey in 1861, and superintendent in 1874.

PATTERSON, ROBERT, an American military commander and a prominent manufacturer, born in Ireland in 1792, died in 1881. He removed to America and became a merchant in Philadelphia; served as major-general of volunteers in the Mexican and civil wars. He was the owner of immense manufacturing interests in Philadelphia.

PATTERSON-BONAPARTE, see BONAPARTE, ELIZABETH PATTERSON, in these Revisions and Additions.

PATTI, ADELINA MARIA CLORINDA, a distinguished prima-donna, born at Madrid, Feb. 19, 1843, the daughter of a Sicilian tenor and the "Signora Barilli" a Roman. At seven she sang *Costa Diva* in Tripler Hall, New York; and in the same city she made her operatic debut as *Lucia* in 1859. In London she first appeared in 1861 as *Amina* in *La Sonnambula*, when her success was as splendid as it had been in America, and as it since has been wherever she has sung. In Russia, in 1870, she received from the emperor the Order of Merit. Her voice is an unusually high soprano, reaching to F in alt, of rich bell-like tone and remarkable evenness; to these qualities she adds purity of style and the highest artistic finish. Equally at home in the tenderness of deep passion and the sprightly vivacity of comedy she has also sung splendidly in oratorio. She married in 1866 the Marquis de Caux, and on her divorce from him in 1886, the tenor Ernesto Nicolini. Her home is Craig-y-nos Castle, near Swansea, Wales.

PATTI, CARLOTTA, sister of Adelina, born in Florence, Italy, in 1840, died in Paris in 1889. She made her debut in New York City as a concert singer in 1861; was a fine vocalist, but was prevented by a slight lameness from appearing much in opera. She married Ernst de Munck the violoncellist, in 1879.

PATTISON, DOROTHY WYNLOW (1832-1878), English nurse, sister of Mark Pattison the author, born at Hauxwell in 1832. Her enthusiasm was early kindled by the devotion of Florence Nightingale; and in 1864 she joined the sisterhood of the Good Samaritans at Coatham; and was transferred to Walsall in 1865, where she died in 1878, and where

the working-people of the "Black Country," the scene of her heroic labors for their welfare, erected a monument to her memory in 1888.

PATTISON, MARK, an English scholar and author, was born at Hornby in 1813, died at Harrowgate, July 30, 1884. He was brought up at Haugwell, where his father was rector; entered Oriel College, Oxford, in 1832; and became fellow of Lincoln College in 1839. Under the dominant influence of Lincoln he gave himself first to the study of theology, twice carried off the Denver prize, wrote two *Lives of the Saints*, translated for the *Library of the Fathers* the *Matthew* in the *Centena Aurea* of Aquinas, and almost followed his master into the fold of Rome, being saved only, as he himself explains, by his habits of study and a constitutional slowness to act. We have his own account of his spiritual transition from the Puritanism of his home into the atmosphere of Anglicanism, and how that in its turn fell from him as the horizon of the Catholic Church opened itself up before his eyes, only to disappear before "the highest development, when all religions appear in their historical light as efforts of the human spirit to come to an understanding with that Unseen Power whose presence it feels, but whose motives are a riddle." His reaction from Newmanism re-awakened within him all his zeal for pure scholarship, and, no less lofty in his ideal of the teacher than the student, he soon became a tutor of altogether exceptional devotion and influence, and acting head of the college as sub-rector, under Dr. Tatham. On the death of the latter in 1851 Pattison was kept out of the headship which was his right by a discreditable obscurantist intrigue, which gave an almost paralyzing blow to his sensitive nature. A further unsuccessful attempt was made to deprive him of his fellowship on a technical plea; and the result of his disappointment was that for ten years he took little real interest in the life of Oxford, while his ideas of University reform henceforth grew rather towards an increase of the professorial than tutorial system. But his educational sympathies soon extended far beyond mere college life; he published an article on education in the *Oxford Essays*, acted as assistant-commissioner on the Duke of Newcastle's Commission of Inquiry into Elementary Education in Germany, rambled in the long vacations through England, Scotland and Germany, visiting most of the universities of the latter country, and served for three months of 1858 as "Times" correspondent at Berlin. Meanwhile he gave himself up with rare devotion to severe and unbroken study, and scholars soon began to recognize his Roman hand in the columns of the "Quarterly," the "Westminster" and the "Saturday Review." His luminous and thoughtful *Report on Elementary Education in Protestant Germany* appeared in 1859; his equally learned and temperate paper on *Tendencies of Religious Thought in England, 1688-1750, in Essays and Reviews*. At length in 1861 he was elected rector, but, though he made an exemplary head, the spring and elasticity of earlier days were gone. In 1862 he married the accomplished Emilia Frances Strong, afterwards Lady Dilke, who helped him to make Lincoln a social and intellectual centre for a world much wider than the walls of Oxford. Down to his last illness and his death he lived wholly for study, maintaining a mediæval rather than modern ideal of the life of the scholar as a sufficient end in itself.

PATTON, FRANCIS LANDEY, an American educator, born in Warwick, Bermuda, in 1843. He was educated at Toronto and at Princeton; ordained in New York and became a prominent Presbyterian minister; in 1872 was called to the chair of didactic

and polemical theology in the Theological Seminary at Chicago; removed to the College of New Jersey in 1881, and became its president in 1888. He has published valuable theological works, and has been editorially connected with the "Interior" and with the "Presbyterian Quarterly."

PAUILLAC, a port on the left bank of the estuary of the Gironde, in France, thirty miles north of Bordeaux. It is the place from which the best brands of Médoc (claret) are shipped to Bordeaux. Population, 2,216.

PAUL. See *Britannica*, Vol. XVIII, pp. 415-429.

PAULDING, HIRAM, an American rear admiral, son of John Paulding, one of the captors of Major André; born in New York City in 1797, died in 1878. He became a midshipman in 1811; lieutenant in 1816; served against the pirates in the West Indies in 1823; captain in 1844; suppressed the Walker filibustering expedition in 1857; retired as rear admiral in 1861; was in command of the Brooklyn navy yard during the war, and became governor of the Philadelphia Naval Asylum in 1866.

PAULIST FATHERS, an American Roman Catholic missionary society, organized with papal sanction in New York city in 1858, and originally and for some years afterward composed exclusively of priests who, like their founder, Father Isaac Thomas Hecker, were converts from Protestantism. They take no special vows, and can leave the order at will. They aim to adapt themselves to the usages and needs of American life. They are generally men eminent for learning; their schools are of a high order; and the "Catholic World," founded by them in 1865, is the chief Catholic magazine in the United States. They are known collectively as *The Congregation of St. Paul the Apostle*.

PAULOWNIA, a genus of trees belonging to the natural order *Scrophulariaceæ*, with but one species, *P. imperialis*, a native of Japan, and now grown in the United States. It has heart-shaped leaves and large panicles of purplish flowers. The name is derived from that of a Russian princess, Paulovna.

PAWLING, a village of New York, 65 miles north of New York City. It is the seat of Pawling Institute. Marble is quarried in the vicinity.

PAWNBROKING, the lending of money at a certain rate of interest on the security of goods, such as jewelry, apparel, utensils or tools deposited with the broker.

A *Pawn* is a contract whereby the owner of a thing delivers it to a creditor as security for a debt contracted by himself or by a third party. This contract is of great antiquity, as may be seen on referring to the story of Judah and Tamar (Gen. xxxviii) and the provisions of the Mosaic law (Exod. xxii). In modern times the superior class of money-lenders have often advanced money on pledges of plate, etc.; this was the business carried on by the Lombard traders, from whom Lombard street in London takes its name; and it is said that the three golden balls which figure over every pawnshop were taken from the armorial bearings of the Medici family. Property of considerable value is sometimes pawned with bankers and others; and an equitable mortgage may be described as a kind of pawn. Among the poorer classes, clothes, tools, etc. are frequently pledged when money runs short; like other small money-lenders, the pawnbroker is regarded by his customers as an extortioner, though the profits of the trade are not particularly high. On the continent efforts have been made to supersede the pawnshop by establishing what are called *Monts de Piété*. In England a quasi-charitable institution of the same kind was started in 1708, but it came to a disastrous end in 1731; another scheme, started during the bubble

mania of 1824-25, was equally unfortunate. In Ireland there were, in 1841, as many as eight Monts de Piété, but they had all disappeared by 1853. On comparing the rules and charges of the Mont de Piété at Paris (the largest establishment of the kind in the world) with those of English pawnbrokers, it does not appear that there is any striking superiority in the French system. It is understood that the Paris establishment is superior to the London pawnshop in two points—it charges a lower rate of interest, and gives greater facilities for recovering stolen goods. On the other hand it is said that officialism, which must prevail where a large staff is employed, makes it more difficult for the poor to obtain advances.

The rules of English common law which apply to a contract of pawn are founded in part upon the Roman law. The pawnbroker acquires what is sometimes called a special property in the goods deposited; he has a right to retain them, and if the debt be not paid within the stipulated time, he has a right to sell them; if the sale produces more than the amount of the debt, he must account for the surplus. The pawner has a right to redeem at any time before sale; interest is not due unless there is an express or implied contract to pay.

In the United States the pawnbroking business is regulated by the laws of the several States. Usually the mayor of a city has the power to grant and issue licenses to pawnbrokers in the respective city. Pawnbrokers are required to be persons of good repute. In New York the rate of interest is limited to 25 per cent. per annum on sums less than \$25, and to 7 per cent on sums above \$25, yet the rate usually charged is 3 per cent. per month, and there are further charges for storage, safe-keeping, etc., which reduces the sum received by the pawner materially. The unredeemed pledges must be sold at public auction.

The law also demands that the amount received for any article over the pawnbroker's just claims shall be returned to the pawner. Pawnbrokers' shops are usually found on business streets of the poorer districts of our cities, and are more patronized by the foreign population than by the native Americans.

PAWNEES, a tribe of North American Indians now in the Indian Territory. See **INDIANS**, **NORTH AMERICAN**, in these Revisions and Additions.

PAW PAW, a village of Michigan, on the Paw Paw River, twenty miles west at Kalamazoo. It has an excellent water-power, many mills, and a good trade in wheat, lumber and wool.

PAWTUCKET, a city of Rhode Island, on Pawtucket River, about five miles north of Providence. Population in 1890, 27,502. See *Britannica*, Vol. XVIII, p. 439.

PAXTON, a city of Illinois, about fifty miles east of Bloomington. It has a good trade and a variety of manufactures.

PAYER, JULIUS, an Austrian explorer, born at Schönau in 1842. He entered the army as lieutenant in 1859, became professor of history at the military academy of Vienna in 1865, and in 1869 to 1870 he accompanied the German expedition to the North pole under Captain K. Koldewey. In 1872 he was given, in conjunction with Herr Weyprecht, the mission to ascertain if an open sea exists east of Spitzbergen, between Europe and America. Their steamship, *Tegetthoff*, became imprisoned between ice-fields near Nova Zembla. After enduring great hardships, Payer and Weyprecht landed, in April, 1874, at Franz Joseph Island, where they had to abandon the ship. They then traveled 300 miles on sledges, embarked on two canoes, and were, after suffering great priva-

tions, picked up by a Russian whaler, which carried them to Lapland. Thence they returned to Vienna by land in July, 1874. Payer was retired from the army in 1875. He published *Die zweite deutsche Nordpolfahrt* (1874); *Die Expedition des Tegetthoff*, and *Reise nach den Eisfeldern des Nordpols* (1876). He died in 1883.

PAYN, JAMES, an English novelist, born at Cheltenham in 1830, and educated at Eton, Woolwich Academy and Trinity College, Cambridge. In 1855 he published a volume of poems, in 1856 succeeded Leitch Ritchie as editor of "Chamber's Journal," and in 1882 Leslie Stephen as editor of the "Cornhill Magazine." Of his hundred novels, *Lost Sir Massingberd*, *A Woman's Vengeance*, *Carlyon's Year*, *Not Wood but Won*, *By Proxy*, *Thicker than Water*, *The Talk of the Town*, and *The Heir of the Ages*, maintain a fair average of merit, below which they seldom fall, but above which they never rise. A characteristic note is a somewhat thin vein of humor.

PAYNE, HENRY B., an American statesman and manufacturer, born in New York State, Nov. 30, 1810. He was educated at Hamilton College; studied law; was admitted to the bar, and commenced practice at Cleveland 1834; after twelve years was compelled to retire, since which time he has been largely interested in manufacturing, railroads, and many other enterprises; became a member of the State senate of Ohio in 1849; was the Democratic candidate for the United States Senatorship in 1851, and for governor in 1857; was a prominent member of several Democratic conventions; was elected to Congress in 1875; and was United States Senator from 1885 to 1891.

PAYNE, JOHN HOWARD, (1792-1852), the author of *Home, Sweet Home*, was born in New York City, June 9, 1792; passed his early childhood at East Hampton; made his début as an actor in his native city in February, 1809, and in 1813 appeared in London. For thirty years he had a successful career as actor and author of plays, chiefly adaptations. The best known were *Brutus*, *Charles II.*, and *Clari*, or *the Maid of Milan*, which contains the celebrated song for which his memory is cherished. Its music is supposed to have been adapted from a Sicilian air by Sir Henry Bishop. Payne was appointed American consul at Tunis in 1841, and died there, April 10, 1852. It is a singular fact that the man who wrote *Home, Sweet Home* had never a home during the last forty years of his life, and died in a foreign land. His remains were removed to America and buried at Washington in 1883.

PAYNE, SERENO E., born at Hamilton, N. Y., June 26, 1843. He graduated at Rochester in 1864; was admitted to the bar in 1866, and has since practiced law at Auburn; was city clerk of Auburn, 1868-71; supervisor of Auburn, 1871-72; district attorney of Cayuga county, 1873-79; president of the board of education at Auburn, 1879-82; and was elected to Congress in 1883.

PAYNTER, THOMAS H., born in Lewis county, Kentucky, Dec. 9, 1851. He was educated at Centre College, Danville, Ky.; is a lawyer, and has been actively engaged in his profession since his admission to the bar in 1873; was appointed attorney for Greenup county in 1876, and held that office, under appointment, until August, 1878, at which time he was elected to the same office, which he held until 1882; and was elected to Congress in 1889.

PAYSON, a village of Illinois, about fifteen miles northeast of Quincy. It has manufactories of agricultural implements, and is the center of a good local trade.

PAYSON, a village of Utah, near the southern end of Utah Lake, about sixty-five miles south of

Salt Lake City. It has a good local trade. Utah Lake is a sheet of the purest fresh water, and abounds in fish.

PAYSON, EDWARD, an American divine, distinguished for his zeal and piety, born at Ringe, N. H., in 1783, died in 1827. He graduated at Harvard in 1803; became teacher in an academy in Portland, Me.; and was ordained in 1807.

PAYSON, LEWIS E., an American lawyer and statesman, born in Providence, R. I., Sept. 17, 1840. He removed to Illinois in 1852; received a common school education, with two years at Lombard University, Galesburg, Ill.; studied law and was admitted to the bar at Ottawa, Ill., in 1862; removed to Pontiac in 1865; was county judge from 1869 to 1873; and member of Congress from 1881 to 1891.

PAZ-SOLDAN, PEDRO, a Peruvian poet, born at Lima in 1839. In 1850 he went to Europe to pursue literary studies at Madrid, Paris, and Rome. After returning home in 1863 he served in various government offices at Lima, and was sometimes sent abroad in a diplomatic capacity. To the Peruvian journals he contributed many sketches of travels and manners. His *Poesias Peruanas* (1867) give graphic pictures of the people and scenery of Peru. His *Chispazos* is a little volume of sonnets and epigrams. He has also published a *Diccionario de Peruanismos*, in which he illustrates the variations of Peruvian speech from pure Castilian.

PEA, a leguminous plant. See *Britannica*, Vol. XIII, p. 441.

PEABODY, a city of Kansas, eighteen miles northeast of Newton. It has a good local trade.

PEABODY, a village of Massachusetts. Population in 1890, 10,158. See *Britannica*, Vol. XVIII, p. 441.

PEABODY, ANDREW PRESTON, an American divine and author, born in Massachusetts in 1811. He taught theology at Harvard for many years, and was for some time editor of the "North American Review."

PEABODY, ELISABETH PALMER, an American philanthropist and educator, born in Massachusetts in 1804. She has been a voluminous writer of educational works. She became a teacher in Boston in 1822. Her *Chronological History of the United States* was written in conjunction with her sister Mary, wife of Horace Mann. Another sister was the wife of Nathaniel Hawthorne.

PEABODY, OLIVER WILLIAM BOURN, a scientific and biographical writer, pastor for twenty-seven years of the Unitarian church at Springfield, Mass., born in New Hampshire in 1799, died in 1848. His *Birds of the Commonwealth* was prepared for the Massachusetts Zoological Society, of which he was a commissioner. His posthumous works were edited by his son EVERETT PEABODY, born in 1831, and killed at the battle of Shiloh in 1862.

PEACE RIVER, a large river of Canada. It rises in two branches in the Rocky Mountains, in British Columbia, and flows northeast to the outlet of Lake Athabasca, where it joins the Slave River by five widely separate mouths. The delta thus formed is, with that of the Athabasca River, the most fertile part of the country. The river has a length of about 100 miles, but it is much encumbered with rapids. The Peace River was followed by Sir A. Mackenzie in his expedition of 1792-93.

PEACH, a tree and its fruit. See *Britannica*, Vol. XVIII, pp. 442-3. The peach tree is of medium size, usually not over fifteen feet high. It has a spreading head, deep-green, lanceolate leaves, and rose-like flowers. The fruit is a drupe or stone-fruit, the outer portion becoming fleshy, and when ripe very soft and succulent. The stone is hard and rut-like. Peaches are divided into

"clingstones" and "freestones," according as the flesh clings firmly to the stone, or becomes loose when ripe, leaving the stone clean and dry.

In the United States peaches cannot be raised profitably beyond 40° north latitude. They reach their highest perfection in the Middle States. For the market peaches are most abundantly raised in Delaware, New Jersey, Maryland, Virginia and Pennsylvania. In 1888 the crop was estimated at eight millions of baskets. Many peaches are dried, canned, or made into brandy. In California very large crops are raised for canning. The fruit there is large and of excellent quality. But those raised in Missouri, Ohio, Illinois, Florida, Georgia, and Texas are generally sweeter though small.

PEACOCK-STONE, the name under which the dry cartilaginous ligaments of some large lamelli-branchiate molluscs, as the pearl-oyster, have been sold by jewellers.

PEAK, the hilly district of northwest Derbyshire, England, having Castleton for its capital. Measuring some thirty by twenty-two miles, it is watered by the Doye, Derwent, and Wye, and culminates in Kinderscout (2082) feet. The Peak Cavern or Devil's Hole near Castleton penetrates 750 yards; and crowning a rock above the village is Peveril Castle, so named from its first lord, a natural son of William the Conqueror. The wonders of the Peak were celebrated early by Thomas Hobbes and Charles Cotton.

PEALE, CHARLES WILSON, an American painter and naturalist, born in Maryland in 1741, died in 1827. He painted fine portraits of Washington and of his principal officers, with whom he served with distinction throughout the war. He was a popular lecturer, a manufacturer, an ingenious inventor and a creditable scientific writer.

PEALE, REMBRANDT, a distinguished American painter, son of Charles Wilson Peale, born in Pennsylvania in 1778, died in 1860. He painted a portrait of Washington in 1795, and became eminent as a painter of portraits. He published a life of his father, and several works on art. His most famous pictures were *The Court of Death* and *The Roman Daughter*.

PEANUT (*Arachis hypogaea*), a leguminous plant, with branching stem 12 to 18 inches high, and hairy pinnate leaves. Its flowers are papilionaceous, of yellow color, and stand single in the axils of the leaves. After the petals of the lower blossoms are decayed, their flower-stalks bend down, and insinuate their ovaries into the earth 2 to 4 inches deep. Here the fruit develops and ripens. The seeds are borne in an oblong pod, 1 to 1½ inches long, contracted in the middle, and with a reticulated surface of yellowish color. There are usually two seeds in each pod. They are of irregular ovoid form, have two thick cotyledons, and a straight radicle. Peanuts are cultivated in the temperate regions of North America. Their large and pleasant-tasted seeds are much used as food, more than half a million bushels being annually eaten in New York City alone. Formerly they were imported from Brazil and the West Indies. But now Virginia and the Carolinas supply the American market. Peanuts are very nutritious, and contain about twenty per cent. of a fixed non-drying oil as good as olive oil. See *GROUND NUT*, *Britannica*, Vol. XI, p. 221.

PEAR. See *Britannica*, Vol. XVIII, pp. 445-46. The fruit of the pear tree (*Pyrus communis*) tapers towards the stem, and is not sunk in a cavity at the base, as in the apple. It has not the firmness of the apple; but it is more sugary and melting. Near its core the pear has a hard concretion com-

posed of indurated cells. The pear is an ancient fruit. At the present day more than 3,000 varieties of pears are enumerated in the catalogues, though only about twenty of these are in practical cultivation. Among the varieties widely cultivated for sale the greatest favorite is the "Bartlett," which is notable for its size, lusciousness and abundant bearing. Ninety per cent. of the pears grown in the United States for sale are of this variety. Another smaller pear is the "Seckell." This variety is traced to a single tree in the suburbs of Philadelphia. It is of unsurpassed flavor. As a rule pears are better if picked when just mature, and then ripened in the house.

The pear has a wide range of distribution. It flourishes equally on the sea-coast of the South Atlantic and on the highlands of the interior. Pear trees are most largely cultivated in Georgia, Florida and California. The latter State is best adapted to their culture; it produces pears in large quantities and of extraordinary sizes. Many California pears are shipped to the East, and still greater quantities are preserved by canning, for which they are excellently suited, since canning preserves much of their original flavor.

PEA RIDGE, in Arkansas, the scene of a battle fought March 6 to 8, 1862, in which the Confederates were defeated by the Union forces under Gen. Curtis.

PEARSE, MARK GUY, an English Wesleyan Methodist minister and author, born in 1842, at Camborne. His early life in Cornwall, together with his keen and sympathetic insight into the character of the Cornish people, have contributed a distinctive feature to all his sermons and writings. In 1861 he entered as a medical student at St. Bartholomew's Hospital. He was at that time a Methodist local preacher; but, there being little scope for a local preacher in a London circuit, he was before long induced to give himself up to the Wesleyan ministry. His first pastoral charge was in Leeds, where he commenced his labors in 1863. He afterwards "traveled" in the Brixton Hill, Ipswich, Bedford, Highbury and Westminster circuits. After a period of retirement he resumed his ministry at Launceston, and next went to Bristol, where some books on the theme of entire consecration were written by him. *Daniel Quorn and His Religious Notions*, a remarkable sketch of pious Cornish character, was published in 1874. Mr. Pearse is also a powerful temperance orator. Has been recently associated with the London Wesleyan Mission.

PEAT. See under FUEL in Britannica, Vol. IX, pp. 807-810. Peat is found toward the northern border of the United States from New England to North Dakota; but it is not much used as fuel in this country. It consists of partly decomposed roots of small plants, and forms only in cold, moist climates. It is largely used as fuel in Northern Europe.

PEA-WEEVIL, or PEA-BUG, a beetle, which in the larva state, devours the interior of seeds, leaving little but the hull untouched. It is about one-fifth of an inch long, oval, convex; the head bent downwards, black, variegated with bright brown hairs, and with white spots on the wing-cases.

PECAN (*Carya oliviformis*), a North American tree belonging to the hickory genus of nut-trees. It is a handsome, lofty tree, growing to the height of 70 feet, with a straight trunk, and compound leaves. It abounds on the rich bottom lands from Illinois southward to Mississippi, and thrives especially in Arkansas and the Indian Territory. It is the largest of the hickory trees; but its wood is of

little use except for fuel. The fruit of the pecan-tree is the most palatable of all the hickory nuts. It is sweet, of an agreeable flavor, and has a thin, easily broken, yellowish-brown shell, without the internal partitions of the ordinary hickory nut. The pecan is extensively raised for sale in the Southern States.

PECATONICA, a village of Illinois, on Pecatonica River, fourteen miles west of Rockford. It is engaged in pork-packing and in manufacturing.

PECCI, JOSEPH (1807-1890), an Italian cardinal, brother of Pope Leo XIII.

PECK, WILLIAM DANDRIDGE, naturalist, born at Boston, Mass., in 1763, died at Cambridge, Mass., in 1822. He graduated at Harvard College in 1782, devoted himself for twenty years to the study of natural history, and was made professor of this science in Harvard College in 1805. He held this chair till 1822, when he was sent to visit the scientific institutions of Europe, and was absent three years. He published a *Catalogue of American and Foreign Plants* in 1818; *History of the Sing-Worm*; *Description of the Athetine*, and *Methods of Taking Impressions of Vegetable Leaves by Means of Smoke*.

PECULIAR, in English law, a particular parish or church having jurisdiction within itself, and exempt from the jurisdiction of the ordinary.

PEDEE, GREAT, a river of North and South Carolina. It rises in the Allegheny Mountains, in the northwest of North Carolina, and running south by east flows through the east portion of South Carolina, and enters the Atlantic through Winyaw Bay at Georgetown. It is navigable to Cheraw, 150 miles, and is about 350 miles in length. The LITTLE PEDEE, its principal eastern branch, is formed by the confluence of several smaller rivers in the south part of North Carolina.

PEDICELLARIE, remarkable minute appendages of the integuments of many of the Echinodermata, having the form of a stalk, with a small two-bladed or three-bladed forceps at its summit. They are generally believed to be organs of the star-fish or sea-urchin.

PEDRO II., de ALCANTARA, the last Emperor of Brazil, son of Pedro I. of Brazil and IV. of Portugal born Dec. 2, 1825. He succeeded in 1831; was crowned in 1841; married a daughter of the king of Naples in 1843—issue, one daughter, married to a son of the Duke de Nemours. Pedro II. was deposed in 1889, upon the peaceful establishment of the United States of Brazil. He died in 1891. See BRAZIL, in these Revisions and Additions.

PEEKSKILL, a village of New York. Population in 1890, 10,026. See Britannica, Vol. XVIII, p. 452.

PEEL, ARTHUR WELLSLEY, speaker of the British house of commons, born in 1829, being the son of the celebrated Sir Robert Peel. He entered parliament in 1865, was parliamentary secretary to the poor law board in 1868-71; secretary of the board of trade 1871-73; patronage-secretary of the treasury 1873-4; under-secretary of the home department in 1880; and was elected speaker in the house in 1884 and reelected in 1886.

PEEL, SAMUEL W., an American statesman, born in Independence county, Ark., Sept. 13, 1832. He received a common school education; was elected clerk of the circuit court of Carroll county, Ark., in 1858, and again in 1860; entered the Confederate service in 1861 as a private, and was elected major of the 3rd Arkansas infantry (State troops); re-entered the Confederate service in 1862 as a private, and was elected colonel of the 4th regiment Arkansas Infantry; at the close of the war he commenced the practice of law in the State courts;

was appointed prosecuting attorney of the 4th judicial circuit of Arkansas in 1873; upon the adoption of the new constitution in 1874 was elected to the same place, and was elected member of Congress from 1883 to 1893.

PEEL-TOWERS, towers erected on the Scottish borders for defense. They are square, with turrets at the angles, and the door is sometimes at a height from the ground. The lower story is usually vaulted, and formed a stable.

PEET, HARVEY PRINDLE, an American educator, prominent as a teacher of the deaf and dumb, born in Connecticut in 1794, died in 1873. He taught for ten years in Hartford, and became principal of the New York Institution for Deaf Mutes in 1831.

PEGASSE, or **PACASSE** (*Bos pegasus*), a species of ox, a native of the interior of Western Africa.

PEGASUS, a genus of fishes, constituting the



SEA DRAGON (*Pegasus draco*).

family *Pegasiæ*, related to the group *Lophobranchii*. The species are few; they are small fishes, natives of the Indian seas, interesting from their peculiar form and appearance. The breast is greatly expanded, much broader than high, the gill-openings in the sides; the pectoral fins are extremely large and strong; a long snout projects before the eyes, and the mouth is situated under and at the base of it; the body is surrounded by three knobbed or spinous rings.

PEKIN, a city, the county-seat of Tazewell county, Ill., on the Illinois River. It is the trade-center of a rich farming district, and produces a variety of important manufactures.

PELHAM, a village of New York, fifteen miles northeast of New York City. It contains many beautiful country residences.

PELLA, a village of Iowa, seat of the Central University of Iowa and the center of a variety of manufacturing and other interests.

PEMBERTON, JOHN C., an American soldier, born in Pennsylvania in 1814, died in 1881. He graduated at West Point; served in the Seminole and Mexican wars; became a lieutenant-general in the Confederate army, and was in command of Vicksburg when that city was taken by General Grant in 1863.

PEMBROKE, a village of Maine, ten miles northwest of Eastport. It is the seat of an extensive iron and nail manufactory.

PEMBROKE, a village of New Hampshire, on the Merrimac River, five miles south of Concord. It is the seat of an academy.

PEMICAN, as made by the American Indians, consists of the lean portions of venison dried by the sun or wind, and then pounded into a paste and tightly pressed into cakes; sometimes a few fruits of *Amelanchier ovata* are added, to improve the flavor. It will keep for a very long time uninjured. That made for the Arctic voyagers is chiefly of beef.

PEN. See *Britannica*, Vol. XVIII, pp. 483-4.

In 1860 the "Esterbrook Steel Pen Company" started an extensive steel pen factory at Camden, N. J.; and this house is to-day the largest maker

of steel pens in America. In 1881 the firms Turner & Harrison, of Philadelphia, and the Miller Bros. Cutlery Company, of Meriden, Conn., entered the field of manufacturing steel pens. These three firms are now the only makers of steel pens in this country, and their combined annual output is about 1½ millions gross. As raw material these firms use crucible steel made at Birmingham, England, which is imported here both rolled and in the rough. When rolled it is in strips 4 feet long and 3 to 3½ inches wide.

METHOD OF MANUFACTURE.—In making steel pens the strips of steel are first prepared by dipping them for a short time in dilute sulphuric acid, which removes the scale or black surface; the acid itself is afterwards carefully removed by immersion in clean water; the sheets are then passed backwards and forwards through a rolling-mill with smooth rollers, which condense the steel, and reduce it to the exact thickness required, it having been previously cut into strips of various widths, according to the kind of pen to be made; for the ordinary kind its width is seen in Fig. 1. This is then passed through a cutting-machine, which rapidly punches out pieces of the shape down in Figure 2, and in the order shown in Figure 1, which is a portion of the strip with the pieces or blanks, as they are called, cut out; that which is represented is the waste or scrap. The blanks are now passed through a succession of operations, each conducted by a separate person; women or girls are chiefly employed. By the first process after the cutting, they are passed one by one into a machine worked by a small hand lever, which makes the two side-slits as seen in Figure 3. *Piercing* is sometimes performed by the same, but more frequently by a similar machine, in which, however, only one punch may act, and cut out the small hole seen in Figure 4. The repeated rolling and stamping of the metal have by this time made it hard and brittle, and it is necessary to anneal it, for which purpose some thousands of the *slit* and *pierced* blanks are put into an iron box, and placed in the fire

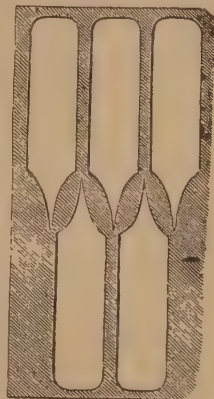
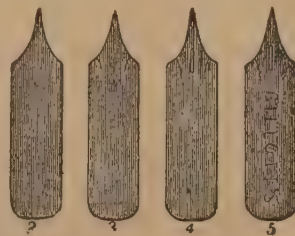


Figure 1.

for a time, which softens them considerably; this is the third process. When cold, another operator receives them and with another hand-press and a punch stamps or marks, as it is called, the name of the maker Figure 5, which constitutes the fourth process. The fifth is somewhat similar, and is sometimes omitted; it consists in placing it under another press, which has a punch and die for embossing any ornamental mark or number. The sixth process, called *raising*, consists in passing into another press, which has a sinker and grooved die as in



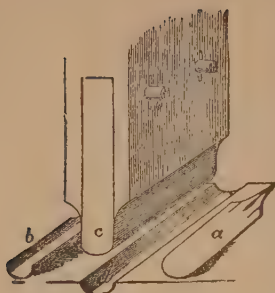


Figure 6. The flat blank *a* is pushed under the sinker *c*, is pressed by the action of the lever into the groove *d*, and comes out with its edges curved up, as in *b*. The seventh process consists in *hardening*, which is done by placing the pens in an iron box or muffle, and when they are at a red heat, throwing them into oil; this renders them exceedingly

brittle and hard, too much so, indeed, for they have now to pass through the eighth or *tempering* process, which brings them to the required temper or hardness and elasticity. The ninth operation is *scouring*; this consists in putting a large number into a tin cylinder, which is kept revolving by machinery; sand and coarse emery-powder are mixed with them; and the friction of these materials and of the pens themselves cleanses them from all impurities, and brings out the natural color of the metal. The tenth and eleventh processes consist in grinding the outside of the nib, first lengthwise (fig 7), and then crosswise (fig. 8), which are done by different persons at separate grinding-wheels. Next follows the most important operation, constituting the twelfth process or *slitting*—that is, making the central slit, upon the



nicety of which the whole value of the pen depends. This is done in a hand-press similar to the others, but the cutting part consists of two chisels, one fixed on the table, the other coming down on the depression of the lever, and so accurately adjusted as to just clear each other. The operator then skillfully holds the pen lengthwise on the fixed chisel, and brings down the movable one, so as to effect the beautifully clean cut which constitutes so important a feature in the manufacture. Two other processes, the thirteenth and fourteenth, finish the series: the first is coloring, by heating them in a revolving cylinder over a charcoal stove, which gives them a blue or yellowish color, according to the time employed; and the last is varnishing them with a varnish composed of lac and naphtha.

The process of manufacture has changed very little during the last twenty years. After the pens are finished, they are assorted. Each pen is examined. They are then packed in boxes containing a gross each, and the boxes are packed into cartons of twenty-five gross each.

At first only pens having fine points were wanted. Now, however, many writers want "stub" pens, which have short and rather broad points.

GOLD PENS.—Gold pens were first made in this country by John Isaac Hawkins, an Englishman, who after years of experimenting had succeeded in making a serviceable gold pen. In 1836 Simeon Hyde, an American, purchased Hawkins' business for \$1,500 and a royalty on the pens sold. The process of making gold pens was not covered by patent; it was therefore kept secret by Hyde. But it leaked out gradually, and by 1849 there were fifteen firms engaged in making gold pens. To-day

the gold pens are provided with iridium tips, and their manufacture is a special industry.

FOUNTAIN PENS.—N. A. Prince, of New York, brought out the first fountain pen in 1848. A metal barrel contained the ink, and a valve controlled its flow. During the last thirty years a great many improvements in fountain pens have been made, and numerous patents have been taken out for fountain pens of different constructions. The variations are chiefly in the means employed for feeding the ink to the pen. The "stylographic" pen is a fountain pen which has no nib, but a tapered point tipped with iridium, and pierced with a fine aperture. This aperture is closed by a thin iridium plug or needle attached internally to a fine gold spring, which pushes back when the writer presses the point of the pen upon the paper, and lets the ink flow to the point. This pen has become very popular.

PENALTY is (1) a punishment annexed by law or judicial decision, to a violation of law; it means usually a sum of money to be paid. But the expression "death penalty" is also often used.

(2) A penalty provided by contract is a forfeit which an obligor agrees to pay if he shall fail to fulfill his part of the agreement. The most ordinary form of penalty is that named in a bond. In a common money bond the obligor often binds himself in absolute terms to pay to the obligee a certain sum which is the "penalty;" but in a subsequent clause, called the condition, it is provided, that if he shall pay another and smaller sum with interest at a specified time, the entire obligation shall be void. A penalty thus inserted in a contract, is a mere matter of form. Its legal effect was long established by equity; and this equitable doctrine has been fully accepted by courts of law. The party who fails to perform his agreement does not thereby forfeit the whole sum mentioned as the penalty, but is liable only for the amount of damages actually sustained by the other party, and upon payment of such damages, or the principal and interest of the debt if the instrument is a penal bond, he is discharged from all other obligation. Under certain circumstances, however, such a clause is treated as any other promise to pay and is binding according to its terms, so that the exact amount named in the contract can be recovered from the obligor.

PENCIL, see *Britannica*, Vol. XVIII, pp. 489-90. The manufacture of lead pencils was started in this country in 1861 by A. W. Faber, of Stein, Germany. His factory was located in New York City. But it burnt in 1872, and a new one was built at Greenpoint, L. I. In 1865 the Eagle Pencil Co. entered this field of manufacture, and the American Lead Pencil Co. commenced the business in the same year. They were followed in 1872 by the Dixon Crucible Co., which makes also lead pencils. To-day the firms mentioned are the only manufacturers of lead pencils in the United States.

The graphite used for lead pencils is mixed with fire clay. The Dixon Crucible Co. uses American graphite for its pencils. All the other companies employ graphite coming from Bohemia, and Faber uses for his drawing pencils graphite coming from a mine in Siberia. The clay mixed with the graphite is imported from Bohemia and Bavaria. It is of a brownish color, and feels oily or greasy when rolled between the fingers. The cases of most pencils are made of cedar wood which comes from Florida. Other woods have been used to a slight extent. In America machines are now used for most processes, while in Europe they are performed by hand. The consequence is that the American manufacturer produces six pencils, while

the European manufacturer makes only one. The finish is the same in both cases.

PENDANT, or PENNANT, a narrow flag of great length, tapering to a point, and carried at the head of the principal mast in a royal ship, to show that she is in commission.

PENDER, WILLIAM D. (1834-1863), a Confederate general, born in North Carolina in 1834. He graduated at West Point, and was active on the frontier until 1861; became major-general in the Southern army, and was killed at Gettysburg in 1863.

PENDLETON, a township of Lancashire, England, with a station on the Lancashire & Yorkshire Railway. It is a suburb of Manchester, and is two and a half miles west-northwest of the town of that name. Population, 25,489.

PENDLETON, a village of South Carolina, twenty miles southeast of Walhalla. It is the seat of two academies.

PENDLETON, EDMUND, a lawyer and an American statesman, born in Caroline county, Va., in 1721, died at Richmond, Va., in 1803. In 1752 he was elected to the house of burgesses; in 1774 he was a member of the first continental congress. In 1776 he drafted the resolution instructing the delegates of Virginia to propose in congress a declaration of independence. During the Revolutionary war he was chairman of the Virginia Committee of Safety. When the State of Virginia was organized, he became speaker of the house. He also presided over the State convention which ratified the Federal constitution. From 1779 till his death Pendleton was president of the court of appeals.

PENDLETON, GEORGE H., born in Ohio in 1825. He became a member of Congress in 1857; United States Senator 1879; and minister to Germany in 1885.

PENEDO, a flourishing town of Brazil, in the province of Alagoas, fifty miles southwest of Maceio, on the San Francisco, near its mouth. In the district, cotton, rice, and other crops are grown. Population of town 9,000, of district, 17,574, mostly Indians.

PENFIELD, a village of New York, on Irondequoit Creek, eight miles east of Rochester. It contains a number of mills.

PENINSULAR CAMPAIGN. See UNITED STATES in Britannica, Vol. XXIII, p. 777, § 284.

PENN, JOHN, a signer of the Declaration of Independence, born in Virginia in 1741, died in 1788. He held various public offices, and was a member of Congress.

PENNALISM, the name given to a practice once prevalent in the Protestant universities of Germany, which seems to have been essentially the same as the fagging of the English public schools. The freshmen or students of the first year were considered by the elder students as virtually their servants. Pennalism is said to have been introduced in the beginning of the 17th century, and to have been mostly confined to the Protestant universities of Germany. But the germs and modifications of it were much earlier and more general. The servitude imposed on the pennals was probably an aping of the usage of chivalry, by which a candidate for knighthood had to serve for a time as page to one already a knight. All attempts to check the evils of pennalism were long unavailing. Edicts against the practice were issued in Jena and other universities about the beginning of the 17th century, but it was not till the last half of the century that the universities, by uniting in severe measures, were able to check the evil.

PENNINGTON, JOHN B., an American statesman,

born near New Castle, Del., Dec. 20, 1825. He received an academic education at New Castle and Newark, Del., and a collegiate education at Jefferson College, Pa.; went to Indiana and was engaged in teaching; returned to Delaware, studied law under the direction of Hon. Martin W. Bates, and was admitted to practice in April, 1857; was a member of the State house of representatives in 1857; was clerk of the house in 1859, 1863 and 1871; was a delegate to the Democratic national convention at Charleston and Baltimore in 1860; was appointed United States Attorney for the District of Delaware in 1868 by President Johnson, and attorney-general of the State by Governor Ponder in 1874, and was a member of Congress from 1887 to 1891.

PENNINGTON, WILLIAM (1757-1826) a Revolutionary soldier. He became associate judge of the supreme court of New Jersey in 1804; was governor in 1813, and United States district judge from 1815 to the time of his death. His son, WILLIAM PENNINGTON (1796-1862), held many important offices. He was governor of New Jersey from 1837 to 1843; a member of Congress in 1859, and was chosen Speaker of the House.

PENNSYLVANIA, STATE OF. For the general article on PENNSYLVANIA, see Britannica, Vol. XVIII, pp. 498-504. The census of 1890 reports the area and population as follows: Area, 45,215; population, 5,258,014—an increase during the decade of 975,123. Capital, Harrisburg, with a population of 40,164.

POPULATION OF CHIEF CITIES AND TOWNS.—The following table gives the population of the cities and towns which in 1890 had each over 8,000 inhabitants; also their population in 1880 and their increase during the decade:

Cities and Towns.	Pop. 1890.	Pop. 1880.	Increase.	Per Ct.
Allegheny.....	105,287	78,682	26,605	33.81
Allentown.....	25,228	18,063	7,165	39.67
Altoona.....	30,337	19,710	10,627	53.92
Beaver Falls.....	9,735	5,104	4,631	90.73
Braddock.....	8,561	3,310	5,251	158.64
Bradford.....	10,514	9,197	1,317	14.32
Butler.....	8,764	3,163	5,571	176.13
Carbondale.....	10,833	7,714	3,119	40.43
Chester.....	20,226	14,997	5,229	34.87
Columbia.....	10,599	8,312	2,287	27.51
Dunmore.....	8,315	5,151	3,164	61.42
Easton.....	14,481	11,924	2,557	21.44
Erie.....	40,634	27,737	12,897	46.50
Harrisburg.....	40,164	30,762	9,402	29.05
Hazleton.....	11,872	6,935	4,937	71.19
Johnstown.....	21,805	8,380	13,425	160.20
Lancaster.....	32,011	25,769	6,242	24.22
Lebanon.....	14,654	8,778	5,886	67.06
McKeesport.....	20,741	8,122	12,529	152.57
Mahanoy.....	11,286	7,181	4,105	57.16
Meadville.....	9,520	8,860	660	7.46
Mount Carmel.....	8,254	2,378	5,876	247.10
Nanticoke.....	10,044	3,884	6,160	158.60
Newcastle.....	11,600	8,418	3,182	37.80
Norristown.....	19,791	13,063	6,728	51.50
Oil City.....	10,932	7,315	3,617	49.45
Philadelphia.....	1,046,964	847,170	199,794	23.58
Phoenixville.....	8,514	6,622	1,892	27.42
Pittsburgh.....	238,617	156,389	82,228	52.58
Pittston.....	10,302	7,472	2,830	37.87
Plymouth.....	9,344	6,065	3,279	54.06
Portstown.....	13,285	5,305	7,980	150.42
Pottsville.....	14,117	13,253	864	6.52
Reading.....	58,661	43,278	15,383	35.44
Scranton.....	75,215	45,840	29,365	64.05
Shamokin.....	14,403	8,184	6,219	75.99
Shenandoah.....	15,944	10,147	5,799	57.13
South Bethlehem.....	10,392	4,925	5,377	109.18
Steelton.....	9,250	2,447	6,803	278.01

Cities and Towns.	Pop. 1890.	Pop. 1880.	Increase.	Per Ct.
West Chester.....	8,023	7,046	989	13.94
Wilkesbarre.....	37,718	23,339	14,379	61.61
Williamsport.....	27,132	18,934	8,198	43.30
York.....	20,798	13,940	6,858	49.16

The census returns of several other cities and towns are as follows: Ashland, 7,376; Bethlehem, 6,750; Bristol, 6,535; Franklin, 6,220; Huntingdon, 6,062; Lockhaven, 7,350; Sharon, 7,447; Uniontown, 6,358; Washington, 7,045; Dubois, 6,137; South Chester, 7,067.

AREAS AND POPULATION BY COUNTIES.—The land areas in square miles, and the population, severally, of the counties of the State were as follows in 1890:

Counties.	Areas.	Pop. 1890.	Pop. 1880.
Adams.....	535	33,486	32,455
Allegheny.....	750	551,959	355,369
Armstrong.....	615	46,747	47,641
Beaver.....	463	50,077	39,605
Bedford.....	1,000	38,644	34,929
Berks.....	901	137,327	122,597
Blair.....	594	70,866	52,740
Bradford.....	1,150	59,233	55,541
Bucks.....	610	70,615	68,666
Butler.....	795	55,339	52,536
Cambria.....	680	66,375	46,811
Cameron.....	382	7,238	5,159
Carbon.....	412	38,624	31,923
Centre.....	1,145	43,269	37,922
Chester.....	764	39,377	35,481
Clarion.....	580	36,802	40,328
Clearfield.....	1,079	69,565	43,408
Clinton.....	850	28,685	26,278
Columbia.....	480	36,832	32,409
Crawford.....	1,015	65,324	68,607
Cumberland.....	560	47,271	45,977
Dauphin.....	510	96,977	76,148
Delaware.....	200	74,683	56,101
Elk.....	760	22,239	12,800
Erie.....	770	86,074	74,688
Fayette.....	330	80,006	58,842
Forest.....	410	8,482	4,385
Franklin.....	750	51,433	49,855
Fulton.....	435	10,137	10,149
Greene.....	640	28,935	28,273
Huntingdon.....	890	35,750	33,054
Indiana.....	830	42,175	40,527
Jefferson.....	640	44,005	27,935
Juniata.....	410	16,655	18,227
Lackawanna.....	460	142,088	89,269
Lancaster.....	965	149,095	139,447
Lawrence.....	370	37,517	33,512
Lebanon.....	350	48,131	38,476
Lehigh.....	350	76,931	65,969
Luzerne.....	920	201,208	133,065
Lycoming.....	1,195	70,579	57,486
McKean.....	1,065	46,363	42,565
Mercer.....	680	55,744	56,161
Mifflin.....	375	19,996	19,577
Monroe.....	625	20,111	20,175
Montgomery.....	480	123,290	96,494
Montour.....	130	15,645	15,468
Northampton.....	380	84,220	70,312
Northumberland.....	463	74,698	53,123
Perry.....	550	26,276	27,522
Philadelphia.....	130	1,046,964	847,170
Pike.....	620	9,412	9,662
Potter.....	1,070	22,778	18,797
Schuylkill.....	816	154,163	129,974
Snyder.....	325	17,651	17,797
Somerset.....	1,106	37,317	33,110
Sullivan.....	446	11,620	8,073

Counties.	Area.	Pop. 1890.	Pop. 1880.
Susquehanna.....	850	40,093	40,354
Tioga.....	1,120	52,313	45,814
Union.....	315	17,820	16,905
Venango.....	655	46,640	43,670
Warren.....	855	37,585	27,981
Washington.....	890	71,155	55,415
Wayne.....	738	31,010	33,513
Westmoreland.....	1,035	112,819	78,036
Wyoming.....	396	15,891	15,598
York.....	910	99,489	87,841

GOVERNORS OF PENNSYLVANIA.—The following is a complete list of the governors of the State, with the periods and dates of services:

UNDER THE SWEDES.

Peter Minuit.....	1633	John Printz.....	1643
Peter Hollander.....	1633	John Pappegoja.....	1653
Johann C. Rysingh.....	1654		

UNDER THE DUTCH.

Deryck Schmidt.....	1655	Goeren Van Dyke.....	1657
John Paul Jaquet.....	1655	Wm. Beekman.....	1658
Colony divided into city and company.....	1657-62	Colony united.....	1662
Jacob Alricks.....	1657	Wm. Beekman.....	1662
Alex. D'Hinoyossa.....	1659	Alex. D'Hinoyossa.....	1663
		Captured by the English.....	1664

UNDER THE ENGLISH.

Col. Richard Nichols.....	1664	Anthony Cove.....	1673
Robert Carr.....	1664	Peter Alricks.....	1673
Col. Francis Lovelace.....	1667	Sir Edmund Andross.....	1674

THE PROPRIETARY GOVERNMENT.

Wm. Markham.....	1681	John Evans.....	1704
Wm. Penn.....	1682	Charles Gookin.....	1709
The Council.....	1684	Sir Wm. Keith.....	1717
Commissioners appointed by Penn.....	1688	Patrick Gordon.....	1726
John Blacknell.....	1688	Council.....	1736
The Council.....	1689	George Thomas.....	1738
Thos. Loyd.....	1691	Council.....	1747
Wm. Markham.....	1691	James Hamilton.....	1748
Benj. Fletcher.....	1693	Robert Hunter Morris.....	1752
Wm. Markham.....	1693	Wm. Denny.....	1756
Wm. Markham.....	1695	James Hamilton.....	1759
Wm. Penn.....	1699	John Penn.....	1763
Andrew Hamilton.....	1701	Council.....	1771
The Council.....	1703	Richard Penn.....	1771
		John Penn.....	1776

IN THE REVOLUTION.

Committee of Safety, Benj. Franklin, Chairman, 1776-77.

PRESIDENTS OF THE SUPREME EXECUTIVE COUNCIL.

Thos. Wharton, Jr.....	1777	John Dickinson.....	1782
Joseph Reed.....	1788	Benj. Franklin.....	1785
Wm. Moore.....	1781	Thos. Mifflin.....	1788

STATE GOVERNMENT—UNDER THE CONSTITUTION OF 1760.

Thomas Mifflin.....	1790	Joseph Heister.....	1830
Thomas McKean.....	1799	John Andrew Shulze.....	1823
Simon Snyder.....	1808	George Wolfe.....	1829
William Findlay.....	1817	Joseph Ritner.....	1835

UNDER THE CONSTITUTION OF 1838.

David R. Porter.....	1839	James Pollock.....	1855
Francis R. Shunk.....	1845	Wm. F. Packer.....	1858
Wm. F. Johnston.....	1848	Andrew G. Curtin.....	1861
Wm. Bigler.....	1852	John W. Geary.....	1867
		John F. Hartranft.....	1873

UNDER THE CONSTITUTION OF 1873.

John F. Hartranft.....	1876	Robert E. Pattison.....	1883-87
Henry M. Hoyt.....	1879-83	James A. Beaver.....	1887-91
		Robert E. Pattison.....	1891-95

The governor's official term closes Jan. 15, 1895. The governor's salary is \$10,000.

CONDENSED HISTORIC OUTLINE.—The first settlement within the present boundaries of Pennsylvania was by Swedish colonists in 1638. This settlement was captured by the Dutch who made other settlements at the Minisinks in 1660. In

1664 the English captured New Amsterdam (New York) and the Pennsylvania colonists united their fortunes with the latter. In March, 1681, Charles II. of England granted to William Penn the tract embracing the present State of Pennsylvania. Philadelphia was founded in 1682. Penn made friendly treaties with the Indians, and peace prevailed throughout the colony for 60 years. Philadelphia was the chief seat of meeting of the Continental Congress, and in Independence Hall in that city the "Declaration of Independence" was adopted, signed, and promulgated in 1776. A State constitution was adopted in 1790—and this was revised in 1838, 1850, and 1857, and during the civil war; and a new one was adopted in 1873. In 1799 the capital was removed from Philadelphia to Lancaster, and in 1812 to Harrisburg.

THE IRON INDUSTRY.—Iron was first made in Pennsylvania in 1692, and was described by Richard Frame, as "a piece of some forty pounds." The first successful iron works in the State were established in 1716, by Thomas Rutter, at Manatawny Creek, in Berks county, about three miles above Pottstown.

In 1617, Samuel Nutt, a Quaker, established a forge on French Creek, in the northern part of Chester county. After the Revolution the manufacture of iron received a fresh impulse, and was extended farther into the exterior. The first iron manufactured west of the Allegheny Mountains is said to have been made in 1790, "in a smith's fire," by John Hayden, of Haydensville, Fayette county. Until about 1840 nearly all the iron manufactured was made with charcoal fuel. Anthracite coal had been used as early as 1815, but proved a failure owing to the blast used being cold. In December, 1831, Dr. F. W. Geissenheimer applied for a patent on an application of a hot air blast to anthracite coal in the manufacture of iron. This invention was the commencement of a new era in the iron manufacture of the country. Furnaces and other iron establishments were quite numerous by 1835, and many additions were made during the next 15 or 20 years. The first rolling mill in the United States to puddle iron and roll iron bars was built on the Redstone Creek in 1816-17. At present the iron interests of the State are enormous. Extensive mills, producing iron of almost every known description, are located at Philadelphia and Pittsburgh—the chief iron manufacturing cities. A very large business is also done in the manufacturing of machinery, textile fabrics, glass, leather goods, and many other articles.

THE COAL FIELDS.—Nearly all of the anthracite coal in the United States, and more than half of the bituminous coal mined are taken from the Pennsylvania mines. The production of anthracite coal practically dates from 1820 when the yield was less than 2,000 tons. By 1840 the annual yield reached over 1,000,000 tons, and for 1881 it was 30,261,940 tons. The anthracite coal-fields of Pennsylvania cover an area of only 472 square miles, but the veins are

very thick. It is found in long narrow basins, disposed mainly in three fields: 1st, the Schuylkill and Mine Hill field, with an area of 146 square miles; 2nd, the Shamokin, Mahanoy, and Lehigh basins, with an area of 128 square miles; 3rd, the Lackawanna and Wyoming field, with an area of 198 square miles. Anthracite coal was first used as fuel by two Connecticut blacksmiths, named Gore, in 1768, and was brought into domestic use by Judge Jesse Fell of Wilkesbarre, in 1808. The bituminous coal-fields are in the western and southwestern part of the State; they cover about 12,000 square miles, and the annual product of the mines is over 15,000,000 tons. Block coal is found in Mercer county.

THE PETROLEUM FIELD.—The coal-oil or petroleum field is in the western and northwestern part of the State, and the product of the wells is enormous. The history of the development of the petroleum district of the State is very remarkable. Under the name of "Seneca oil" petroleum had long been known and obtained on Oil Creek. It was not, however, until 1845 that oil was found in any quantity. In that year a bore for a salt well developed two oil springs that yielded a barrel in 24 hours. In 1854 a company was organized in New York, land purchased, and experiments made in refining the oil. In 1859 a New Haven company put down a well at Titusville, which, by pumping, produced 1,000 gallons of oil per day. As other wells were sunk, some were found that flowed 3,000 barrels per day from a depth of 500 to 700 feet. An intense excitement overran the whole country. The few fortunate land-owners suddenly became millionaires. The oil brought immense prices, and well after well was put down till, at the end of 1860, more than 2,000 had been sunk in the vicinity of Oil Creek. The business has now assumed a stable character, through the basis of extensive speculations. The crude oil is now transported eastward by the means of "pipe lines." Pipes of large bore are laid near the surface of the ground, and pumping stations are located at intervals to pump the oil through the pipes.

CANALS OF PENNSYLVANIA.—The following table gives some of the facts and figures relating to the canals:

Canals.	Length. Miles.	Width at Top. Feet.	Width at Bottom. Feet.	Depth. Ft.	Locks.	Date.	Cost.
East Division, (Duncan's Island to Columbia).....	46	50-60	34	6	11	1830	Paid Cap. Stock, \$ 4,457,150 Debt, 3,274,500
Juniata Division, (Duncan's Island to Hollidaysburg).....	127	40-60	24-30	4	66	1830	
Susquehanna Division, (Duncan's Island to Northumberland).....	41	40-60	24-30	4	44	1830	
West Branch Division, (Northumberland to Fairlandsville).....	81	40-60	24-30	4	43	1830	
North Branch Division, (Northumberland to Wilkesbarre).....	64	40-60	24-30	4			
Union, (Middletown to Reading).....	78	43	28	4½	132	1827	5,907,000
Junction, (State Line to Elmira).....	18	42	26	4	11	.....	.....
Delaware and Hudson, (Honesdale to Rondout).....	108	48	30	6	106	1829	6,317,653
Delaware Division, (Easton to Bristol).....	60	44	26	6	32	1830	.....
Lehigh Coal and Nav. Co., (Easton to Coalport).....	48	60-100	45	6	58	1829	4,455,000
Schuylkill Coal and Nav., (Mill Creek to Philadelphia).....	108	60-300	40-45	6	71	1825	13,207,000
Susquehanna, (Columbia to Havre de Grace).....	45	50	30	5	30	1830	4,857,105
Wilmington, (Millersburg to Clark's Ferry).....	12	45	28	4	7	1836	512,000
Mongahela Nav.....	85	.....	.....	.....	8	1844	1,182,000

PROGRESS OF POPULATION IN PENNSYLVANIA BY DECADES.—In 1790, 434,373; 1800, 602,365; 1810; 819,091; 1820, 1,047,507, 1830, 1,348,233; 1840, 1,724,033; 1850, 2,311,786; 1860, 2,906,215; 1870, 3,521,951, 1880, 4,282,891; 1890, 5,258,014. For numerous other items of interest relating to Pennsylvania, see the article UNITED STATES, in these Revisions and Additions.

PENNSYLVANIA UNIVERSITY. See COLLEGES AND UNIVERSITIES IN UNITED STATES in these Revisions and Additions.

PENN YAN, a village, the county-seat of Yates county, N. Y., on Kenka Lake, about fifty miles southeast of Rochester. It is the seat of an academy, and has an excellent water-power and several manufactories.

PENOBSCOTS are a tribe of Indians of the Algonquin family, living on an island in Maine, near the mouth of the Penobscot River. They count about 500 souls and are Roman Catholics.

PENSACOLA, a seaport city, the county-seat of Escambia county, Fla., on Pensacola Bay. Population in 1890, 11,751. See Britannica, Vol. XVIII, p. 504.

PENSION SYSTEM OF THE UNITED STATES. A pension is a periodical payment of money by the Government to a person retired from service, or to his widow and children, in consideration of his past services, especially a yearly sum granted to retired soldiers and sailors who have been wounded or disabled in the performance of their duties. The pension system of the United States differs from those of European countries in the fact that pensions are here only granted for military or naval services during a war, but not for long services during peace times, and that they are only paid to invalids, who in whole or in part have become disqualified for the performance of manual labor by reason of wounds or diseases contracted in the services.

RATES OF PENSIONS.—In 1816 the "total pension" for privates was fixed at \$3 per month; for second lieutenant \$15; first lieutenant \$17; captain \$20; major \$25; and lieutenant-colonel and all officers of higher rank \$30. Like rates were fixed for naval officers of the same relative rank. Fractional ratings were given for lesser degrees of disability.

In 1866 Congress created three grades above that of "total pension." What is known as the "first grade pension" includes cases of permanent disability in a degree requiring the regular aid and attendance of another person. This grade entitles the beneficiary to \$50 per month. On June 16, 1880, an act was passed increasing the pension of all who were then on the roll at \$50 to \$72. The "second grade pensions" include cases of permanent incapacity for the performance of any manual labor. The pension for these cases is \$30 per month. The "third grade pensions" are for disability equivalent to the loss of a hand or foot, the rate being \$24 per month. For disability below these grades the rates range from \$2 to \$18 per month for privates, non-commissioned officers and lieutenants, the maximum in the cases of officers above the rank of lieutenant being the old "total of rank." There is also a class of "permanent specific" disabilities, such as the loss of both hands, both feet, or both eyes. For these cases the pension is fixed at \$72 per month. For amputation at the shoulder or hip joint, or so near the joint that no artificial limb can be used, \$45 per month is paid; for total disability of an arm or leg, loss of one hand and one foot, or total disability of the same, or amputation at or above the knee \$36; for the loss of a hand or foot, or total disability of the same, or for total deafness, \$30 per month.

Widows of privates receive \$12 per month, and \$2 additional for each child of the deceased soldier. When no widow survives, minor children receive their pension jointly. Dependent parents receive \$12 per month; widows and dependent parents of commissioned officers receive the "total of rank."

We give here the United States pension law which is in force at present. It was approved March 4, 1890.

UNITED STATES PENSION LEGISLATION.—*Pensions to the Totally Helpless.*—This act provides that all soldiers, sailors and marines who have since the 16th day of June, 1880, or who may hereafter become so totally and permanently helpless from injuries received or disease contracted in the service and line of duty as to require the regular personal aid and attendance of another person, or who, if otherwise entitled, were excluded from the provisions of "An act to increase pensions of certain pensioned soldiers and sailors who are utterly helpless from injuries received or disease contracted while in the United States service," approved June 16, 1880, shall be entitled to receive a pension at the rate of \$72 per month from the date of the passage of this act or of the certificate of the examining surgeon or board of surgeons showing such degree of disability made subsequent to the passage of this act.

The Dependent Parents and Disability Act.—The act provides that in considering the pension claims of dependent parents, the fact of the soldier's death by reason of any wound, injury, casualty or disease which, under the conditions and limitations of existing laws, would have entitled him to an invalid pension, and the fact that the soldier left no widow or minor children having been shown as required by law, it shall be necessary only to show by competent and sufficient evidence that such parents or parent are without other means of support than their own manual labor or the contributions of others not legally bound to their support; Provided, that all pensions allowed to dependent parents under this act shall begin from the date of the filing of the application hereunder, and shall continue no longer than the existence of the dependence.

SEC. 2. That all persons who served ninety days or more in the military or naval service of the United States during the late war of the rebellion, and who have been honorably discharged therefrom, and who are now or who may hereafter be suffering from a mental or physical disability of a permanent character, not the result of their own vicious habits, which incapacitates them from the performance of manual labor in such a degree as to render them unable to earn a support, shall, upon making due proof of the facts according to such rules and regulations as the Secretary of the Interior may provide, be placed upon the list of invalid pensioners of the United States, and be entitled to receive a pension not exceeding \$12 per month and not less than \$6 per month, proportioned to the degree of inability to earn support; and such pension shall begin from the date of filing of the application in the Pension Office, after the passage of this act, upon proof that the disability then existed, and shall continue during the existence of the same. Provided, That persons who are now receiving pension under existing laws, or whose claims are pending in the Pension Office, may, by application to the Commissioner of Pensions, in such form as he may prescribe, showing themselves entitled thereto, receive the benefit of this act; and nothing herein contained shall be so construed as to prevent any pensioner thereunder from prosecuting his claim and receiving his pension under any other general or special act: Provided, however, That no person shall receive more than one pension for the same period: And, provided further, That rank in the service shall not be considered in applications filed under this act.

SEC. 3. That if any officer or enlisted man who served ninety days or more in the army or navy of the United States during the late war of the rebellion, and who has been honorably discharged has died, or who shall hereafter die, leaving a widow without other means of support than her daily labor, or minor children under the age of sixteen years, such widow shall upon due proof of her husband's death, without proving his death to be the result of his army service, be placed on the pension roll from the date of the application therefor under this act at the rate of \$8 per month during her widowhood, and shall also be paid \$2 per month for each child of such officer or enlisted man under sixteen years of age, and in case of the death or remarriage of the widow, leaving a child or children of such officer or enlisted man under the age of 16 years such pension shall be paid such child or children until the age of sixteen. Provided, That in case a minor child is insane, idiotic or otherwise permanently helpless, the pension shall continue during the life of said child, or during the period of such disability, and this proviso shall apply to all pensions heretofore granted or hereafter to be granted under this or any former statute and such pension shall begin from the date of application therefor after the passage of this act. And, provided, further, That said widow shall have married said soldier prior to the passage of this act.

SEC. 4. That no agent, attorney or other person engaged in preparing, presenting, or prosecuting any claim under the

provisions of this act, shall, directly or indirectly, contract for, demand, receive, or retain for such services in preparing, presenting or prosecuting such claim a sum greater than ten dollars, which sum shall be payable only upon the order of the Commissioner of Pensions by the pension agent making payment of the pension allowed, and any person who shall violate any of the provisions of this section, or who shall wrongfully withhold from a pensioner or claimant the whole or any part of a pension or claim allowed, or due such pensioner or claimant under this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall for each and every such offence be fined not exceeding five hundred dollars or be imprisoned at hard labor not exceeding two years, or both, in the discretion of the court.

The following list shows the number of pensioners in 1890 and the amount of money paid by the United States Government for pensions in that year:

Year ending June 30, 1890.	Number of pensioners 1890, June 30.	Annual value of pensions as shown by 1890, roll June 30.
Army.....	392,809	\$51,250,064 49
Widows, etc.....	104,458	15,902,996 00
Navy.....	5,274	756,043 00
Widows, etc.....	2,450	488,148 00
War of 1812.....	413	44,820 00
Survivors.....	8,610	1,239,840 00
Widows.....	17,138	1,650,552 00
War with Mexico.....	6,764	649,680 00
Widows.....		
Total	537,944	\$72,052,143 49

NOTE.—Average annual value of each pension on the roll June 30, 1890, \$133.94.

PENTASTYLE, a building with a portico of five columns.

PENTATEUCH. See *Britannica*, Vol. XVIII, pp. 505-14.

PEORIA, a city, the county-seat of Peoria county, Ill., on the Illinois River. Population in 1890, 40,758. See *Britannica*, Vol. XVIII, p. 515.

PEPERINO, an Italian term applied by some geologists to the brown volcanics tufts derived from augitic rocks, to distinguish them from the ordinary tufas, which name they confine to the lighter colored pumiceous rocks that have more trachyte in their composition.

PEPPERELL, SIR WILLIAM, a distinguished Indian fighter, born at Kittery Point, Me., in 1696, died in 1759. He held many important colonial offices, and was acting governor of Massachusetts from 1756 to 1758.

PEQUOITS. See *INDIANS, NORTH AMERICAN*, in these Revisions and Additions.

PERCH. See *Britannica*, Vol. XVIII, p. 521-22.

PEREIRA, JONATHAN, an English pharmacologist, born in London, May 22, 1804, died Jan. 20, 1853. In 1823 he was appointed resident medical officer of the General Dispensary in Aldersgate Street, at which institution he became, three years afterwards, lecturer on chemistry. In 1824, he published a translation of the *London Pharmacopoeia*; which was followed by a *Manual for the Use of Students; A General Table of Atomic Numbers, with an Introduction to the Atomic Theory*, and other textbooks for the use of those who were preparing for medical examinations. He laid the foundation of those researches which issued in his great work on *Materia Medica*. In 1832, he resigned the office of lecturer for that of professor of *Materia Medica* in the New Medical School in Aldersgate street, and at the same time he succeeded Dr. Gordon as lecturer on chemistry at the London Hospital. His *Elements of Materia Medica* appeared in 1839-1840, and at once established his reputation as a pharmacologist. Among his other contributions to

science, the best known are his excellent treatises on *Diet* and on *Polarised Light*, both of which appeared in 1843.

PEREJASSLAVL, an ancient town of Russia, in the government of Poltava, 100 miles south of Tchernigov, at the confluence of the Trubesh and Alta, near the Dnieper. A battle was fought here in 1149. Population about 10,000.

PERI (Fairy), according to the mythical lore of the East, a being begotten by fallen spirits, which spends its life in all imaginable delights, is immortal, but is forever excluded from the joys of Paradise. It takes an intermediate place between angels and demons.

PERIAGUA, a large canoe composed of the trunks of two trees, hollowed and united into one fabric, whereas an ordinary canoe is formed of the body of one tree only. Periaguas are used in the Pacific, and were formerly employed among the West India islands, whence the frequent allusion to them in *Robinson Crusoe*.

PERIPTERAL, a term applied to temples or like buildings having columns all around the cella.

PERPETUAL MOTION. If a machine could be devised, constructed and set in motion so as to receive from unfailing sources outside of itself an energy sufficient to fully compensate all obstruction of its motion by friction, gravity or other obstacles, its motion might be described as perpetual. But the projectors of "perpetual motion" aim beyond this and assume the possibility of constructing a machine which itself generates the power to keep itself in motion, that is, a machine which not only keeps up the supply of the original power, but also currently an addition of power sufficient to overcome the obstacles of friction, etc. It has been well said that such a machine is, by the eternal law of physics, an eternal impossibility. No matter how simple or how complex, no matter how delicately adjusted or how slight the friction, this inexorable law remains—the force which originally moves the machine must generate another force equal to itself and some additional force to overcome the friction.

And the law is the same, no matter what device be adopted. Suppose it be (as in many attempts it has been) a series of falling weights on one side of the wheel, those weights must rise exactly as high on the other side of the wheel, and let the combination be what it may, they must pass through as many rising curves as falling curves—that is, as many units of movement against as with gravitation—and the friction of the wheel be overcome besides. Suppose it were possible to reduce friction to a minimum of one unit in a machine whose power was 10,000,000 units, then the power of 10,000,000 would have to generate 10,000,001 to prevent a stoppage.

For further illustration, take the device of a horizontal wheel, the original power applied at a point A on its circumference: A moves around to its original place, there an equal power must be applied to send it around again (for, of course, whatever power sent it around once will be needed for each successive round), and whatever extra power is needed to overcome the friction. Put the original power at 100, then that 100 power must generate a power equal to 100 plus friction. Algebraically stated your problem is to make $100 = 100 + f$. Of course f might be reduced to a very small amount, and it is barely conceivable that a place might be found where there is no f —but not on this earth.

In a perfect vacuum, assuming the production of it to be possible, a top would run a surprisingly long time, there being no friction on the air; but

it must rest on something, and that means friction. If a top could be suspended in mid-air, with some attractive force above it which exactly balanced gravitation, and then set in motion in a perfect vacuum, the thing might be accomplished; but such a condition is obviously impossible. On this earth, there is no motion without friction, and where there is friction, perpetual motion is an eternal impossibility.

PERRY, a village of New York, at the outlet of Silver Lake, eight miles east of Warsaw. It is a summer resort and the seat of an academy.

PERRY, MATTHEW CALBRAITH (1794-1858), commodore in the United States Navy, a brother of Commodore O. H. Perry. He conducted the skillful negotiations which opened Japan to foreign commerce in 1854.

PERRY, OLIVER HAZARD, a commodore in the United States Navy, the hero of the "battle of Lake Erie," commonly known as "Perry's victory;" born in Rhode Island in 1785, died in 1819. He was engaged in the war with Tripoli, and filled many important positions.

PERRY, THOMAS S., an American writer and educator, born in Rhode Island, graduated at Harvard and became tutor there in 1878. He has written a number of works on the history of literature, and was for a time editor of the "North American Review."

PERRY, WILLIAM HAYNE, born at Greenville, S. C., June 9, 1837. He received his early education at Greenville Academy; graduated at the Furman University, Greenville; then entered the South Carolina College at Columbia, but left there before graduation and entered Harvard College, where he graduated in 1859; read law under Hon. B. F. Perry his father, at Greenville; was admitted to the bar and has since practiced; served during the whole war of the rebellion in the Confederate cavalry service; was a member of the State convention of South Carolina in 1865; member of the State legislature of South Carolina 1865-66; solicitor of the 8th Judicial Circuit of South Carolina 1865-72; member of the State senate from Greenville county, 1880-84, and a member of Congress from 1885 to 1891.

PERRY, WILLIAM STEPHENS, a distinguished American divine, bishop of the Protestant Episcopal Church, born in Rhode Island in 1832. He became president of Hobart College in 1876; and bishop of Iowa and president of Griswold College in the same year.

PERRYSBURG, a village of Ohio, on the Maumee River, nine miles southwest of Toledo. It contains a number of manufactories, and is an important shipping-point for lumber and staves.

PERSECUTIONS, THE TEN, of the Christian Church, the name by which are known, in ecclesiastical history, certain periods of special severity exercised towards the rising community of Christians, for the purpose of compelling them to renounce their new creed, and to conform to the established religion of the empire. The notion of *ten* such periods is commonly accepted almost as an historical axiom; and it is not generally known that this precise determination of the number is comparatively recent. In the 4th century, no settled theory of the number of persecutions seems to have been adopted. Sulpicius Severus, in the 5th century, is the first who expressly states the number at *ten*. The ten persecutions commonly regarded as general are the following: that under Nero, A. D. 64; under Domitian, A. D. 95; under Trajan, A. D. 107; under Hadrian, A. D. 125; under Marcus Aurelius, A. D. 165; under Septimius Severus, A. D. 202; under Maximus, A. D. 235; under Decius,

A. D. 249; under Valerianus, A. D. 257; under Diocletian, A. D. 303.

PERSHORE, a market-town in the county of Worcester, nine miles southeast of the city of that name, on the Avon. It contains two churches—that of St. Andrew's, small and ancient; and the church of the Holy Cross, in Norman and early English, with a lofty square tower. This church is the only remaining portion of the ancient abbey-church of the same name. Population, 2,826, who are employed in wool-stapling, in manufacturing agricultural-implements, and in raising fruits and vegetables for the markets of the large manufacturing towns in the vicinity.

PERSIA. For general article on the kingdom of PERSIA, see *Britannica*, Vol. XVIII, pp. 561-660. The latest published official census (that of 1881), reported the area at 628,000 square miles. Population, based largely on estimates, as follows:

Inhabitants of cities.....	1,963,800
Population belonging to wandering tribes.....	1,909,800
Inhabitants of villages and country districts.....	3,780,000
Total population.....	7,653,600

The number of Europeans and Americans residing in Persia does not exceed 450.

The principal cities of Persia are:—Teherán, with a population of 210,000; Tabriz, with 165,000; Ispháñ, Meshed, each with 60,000; Bárfurúsh, with 50,000; Kermán, Yazd, each with 40,000; Hamadán, Shiráz, Kazvin, Kom, Kashán, Resht, each with 25,000 to 30,000 inhabitants. Of the nomads 260,000 are Arabs, 720,000 Turks, 675,000 Kurds and Leks, 20,700 Balúchis and Gipsies, 234,000 Lurs.

REIGNING SHAH AND ROYAL FAMILY.—Násr ed-din, born July 13, 1831; eldest son of Muhammed Sháh; succeeded to the throne at the death of his father, September 10, 1848. Coronation at Teherán, October 20, 1848.

Sons of the Sháh. 1. Muzafer ed-din, heir-apparent (Valiabd), born March 25, 1853, and has four sons and four daughters. 2. Masúd, Zil es-Sultán, born Jan. 5, 1850, and has five sons and four daughters. 3. Kámráñ, Náib es-Saltaneh, born July 22, 1856, and has one son and three daughters. 4. Sálár es-Saltaneh, born May 2, 1882. 5. Rukn es-Saltaneh, born Feb. 14, 1883. There are also thirteen daughters.

The royal family is very numerous; there are some thousands of princes and princesses, but the official year-book only mentions three brothers, three sisters, 140 uncles, great uncles and cousins of the shah.

The Shah of Persia—by his official title "Sháhin-sháh," or king of kings—is absolute ruler within his dominions, and master of the lives and goods of all his subjects.

The whole revenue of the country being at their disposal, recent sovereigns of Persia have been able to amass a large private fortune. That of the present occupant of the throne is reported to amount to five or six millions sterling, most of it represented by diamonds, the largest, the Deryá i Núr, of 186 carats, and the Taj i Máh, of 146 carats, and other precious stones forming the crown jewels.

The present sovereign of Persia is the fourth of the dynasty of the Kajárs, which took possession of the crown after a civil war extending over fifteen years, from 1779 to 1794. The date of accession of each of the four members of the reigning dynasty was as follows:

Agha Muhammed.....	1794	Muhammed.....	1835
Fath Ali.....	1797	Násr ed-din.....	1849

It is within the power of the Persian monarchs to alter or to overrule the existing law of succession and to leave the crown, with disregard of the natural heir to any member of their family.

GOVERNMENT AND RELIGION.—The form of government of Persia is in its most important features similar to that of Turkey. All the laws are based on the precepts of the Koran, and though the power of the shah is absolute, it is only so far as it is not opposed to the accepted doctrines of the Muhammedan religion. The executive government is in the hands of a ministry appointed by the shah. There are at this writing (1891) eleven cabinet ministers. The country is now divided into 27 provinces governed by "governors-general." Every town has a mayor. The Mahometans of Persia are mostly of the sect called Shiah, differing to some extent in religious doctrine, and more in historical belief, from the inhabitants of the Turkish Empire, who are called Sunnî. The Persian priesthood (Ulema) is very powerful and works steadily against all progress. Any person capable of reading the Koran and interpreting its laws may act as a priest (Mulla). Of the population, 6,860,600 belong to the Shiah faith, 700,000 Sunnîs, 8,500 Parsîs (Guebres), 19,000 Jews, 43,000 Armenians, and 23 Nestorians.

EDUCATION.—There are a great number of colleges (medressh), supported by public funds, in which the students are instructed in religion and Persian and Arabic literature, as well as in a certain amount of scientific knowledge; and many schools for children, while private tutors are very common, being employed by all families who have the means. A polytechnic school with a number of European professors, opened in Teherân forty years ago, has done much towards introducing the knowledge of Western languages and science into Persia. There are also military colleges at Teherân and Tabriz. But the bulk of the population are taught only to read the Koran.

FINANCE.—The revenue in 1887 amounted to £1,750,000; the expenditures to £1,630,000. Of the revenue £280,000 was received from customs, and £1,470,000 from direct taxes. Persia, on January 1, 1891, had no public debt.

ARMY AND NAVY.—The Persian army in 1890 numbered, according to official returns of the minister of war, 105,500 men, of whom 5,000 form the artillery (20 batteries), 54,700 the infantry (78 battalions), 25,200, the cavalry, regular and irregular, and 7,200 militia (24 battalions). Of these troops, however, only one half are liable to be called for service, while the actual number embodied—that is, the standing army—does not exceed 24,500. The number liable to be called for service is as follows: Infantry, 35,400; irregular cavalry, but more or less drilled, 3,300, undrilled levies, 12,130; artillery, 2,500; camel artillery, 90; engineers, 100; total, 53,520.

By a decree of the shâh, issued in July 1875, it was ordered that the army should for the future be raised by conscription, instead of by irregular levies, and that a term of service of twelve years should be substituted for the old system, under which the mass of the soldiers were retained for life; but the decree has never been enforced.

The Christians, Jews, and Guebres, as well as the

Mussulman inhabitants of the Kashan and Yezd districts, are exempt from all military service. The army has been under the training of European officers of different nationalities for the last thirty years or more.

The navy consisted of two vessels, built at Bremerhaven—the *Persepolis*, screw steamship, 600 tons, 450 horse-power, armed with four 3-inch guns; and the *Susa*, a river steamer, on the River Karûn, of 30 horse-power, and with one 3-inch Krupp gun.

INTERNAL COMMUNICATION.—A small railway from Teheran to Shah abdul-azim (six miles) was opened in July 1888. Another from Mâhmûdâbad on the Caspian to Barfurûsh and Amol (twenty miles) was in December 1889 under construction. The former is in the hands of a Belgian company, the latter is a private undertaking by a Persian merchant. The River Karûn at the head of the Persian Gulf has been opened to foreign navigation as far as Ahwâz.

The only carriageable roads in Persia are Teherân-Kom and Teherân-Kazvin, each about 94 miles, and on the latter mails and travelers are conveyed by post-carts.

Persia had in 1890, a system of telegraphs consisting of 3,824 miles of line, with 6,124 miles of wire, and 82 stations. The time of transmission of messages to England was one hour and ten minutes.

An extensive postal service has been opened between the chief business of the kingdom, and letters and packages are delivered with much regularity and safety.

RECENT EVENTS.—The shah, after a protracted visit to Europe where he and his extensive retinue were received with marked official favor, announced his purpose to make important changes in the Persian constitution and laws and order that his people might enjoy the quiet and prosperity of the English and Continental nations, and in 1890 he appointed a special commissioner to make the necessary inquiries, and report to him the changes desired.

PERSIAN POWDER, a preparation of the flowers of the composite plant, *Pyrethrum carneum* or *roseum*, which are dried and pulverized. This powder has wonderful efficacy in destroying noxious insects, and is extensively used for that purpose.

PERSIMMON, the Virginia date plum. See DATE PLUM, in these Revisions and Additions.

PERSONAL EXCEPTION, in the Roman law, a ground of objection which applies to an individual, and prevents him doing something which, but for his conduct or situation, he might do. The term is adopted in the law of Scotland.

PERSONIFICATION, a figure of rhetoric by which inanimate objects, or mere abstract conceptions, are invested with the forms and attributes of conscious life. Oratory and poetry often derive great power and beauty from the employment of this figure.

PERTH AMBOY, a city of New Jersey, and a port of entry, at the mouth of the Raritan River, opposite South Amboy, twenty miles southwest of New York. It is the seat of an academy, produces a variety of manufactures, has extensive deposits of fire-clay, and is an important railway terminus. Population in 1890, 9,512.

PERU, REPUBLIC OF. For general article on PERU, see *Britannica*, Vol. XVIII, pp. 669-679. There has been no recent census, but the general opinion is expressed that the real present figures would not vary much from those of 1876. The Republic is divided into nineteen departments, the area and population of which were reported as follows at the last census taken (in 1876):—

Departments.	Area—Eng-lish square miles.	Population.	Departments.	Area—Eng-lish square miles.	Population.
Piura.....	13,931	135,502	Ica.....	6,295	60,111
Cajamarca.....	14,188	213,391	Ayacucho.....	24,213	142,305
Amazonas.....	14,129	34,245	Cuzco.....	95,547	238,445
Loreto.....	32,727	61,125	Puno.....	39,743	208,594
Libertad.....	15,649	147,541	Arequipa.....	27,744	160,282
Ancachs.....	17,405	284,091	Moquegua.....	22,516	28,786
Lima.....	236,922	236,922	Apurimac.....	62,325	119,246
Callao.....	14,760	34,492	Lambayeque.....	17,939	85,384
Huancavelica.....	10,814	104,155	Total.....	463,747	2,621,844
Huanuco.....	33,822	78,856			
Junin.....		209,871			

The careful estimated total population in 1888 was 2,690,945. Total area, 503,000 square miles. Population of Lima, the capital, 101,488.

There are besides about 350,000 uncivilized Indians.

As a result of the war with Chile, the latter country has annexed the province of Tarapaca. The Chilians also occupy the department of Tacna for ten years, after which a popular vote is to decide to which country it is to belong.

CONSTITUTION AND GOVERNMENT.—Present constitution proclaimed October 15, 1856, was revised November 25, 1860. It is modeled on that of the United States, the legislative power being vested in a senate and a house of representatives, the former composed of deputies of the provinces, in the proportion of one for every 30,000 inhabitants or fraction exceeding 15,000, and the latter of representatives nominated by the electoral colleges of the provinces of each department, at the rate of two when the department has two provinces, and one or more for every other two provinces. The parochial electoral colleges choose deputies to the provincial colleges, who in turn send representatives to congress, and elect the municipal councils as well.

The executive power is intrusted to a president. There are two vice-presidents, who take the place of the president only in case of death or incapacity, and they are elected for four years.

President of the republic.—Col. Remigio Morales Bermudez, elected August 10, 1890.

The president has to exercise his executive functions through a cabinet of five ministers, holding office at his pleasure. None of the president's acts have any value without the signature of a minister.

EDUCATION AND RELIGION.—Elementary education is compulsory for both sexes, and is free in the public schools that are maintained by the municipalities. High-schools are maintained by the government in the capitals of the departments, and in some provinces pupils pay a moderate fee. There is in Lima a central university, called "Universidad de San Marcos," the most ancient in America; its charter was granted by the Emperor Carlos V.; it has faculties of jurisprudence, medicine, political science, theology, and applied science. Lima possesses a school of mines and civil engineering,

created in 1874, with good collections and laboratories. There are in the capital and in some of the principal towns private high-schools under the direction of English, German and Italian staffs. Lima has also a public library, with a rich collection, besides the one of the university and school of mines. There are two minor universities at Cuzco and Arequipa.

By the terms of the Constitution there exists absolute political, but not religious freedom, the charter prohibiting the public exercise of any other religion than the Roman Catholic, which is declared the religion of the state. But particularly there is a certain amount of tolerance, there being in Callao and Lima Anglican churches as well as Jewish synagogues. At the census of 1876 there were 5,087 Protestants, 498 Jews; other religions, 27,073.

FINANCE.—The budget for 1889-90 placed the revenue and expenditures at following figures:

Revenue.		Expenditure.	
	Soles.*		Soles.
Customs.....	4,282,250	Congress.....	283,693
Direct taxes.....	1,589,400	Government.....	918,571
Railways.....	74,750	Min. Foreign Affairs.....	177,300
Post Office.....	188,197	" Justice.....	462,045
Telegraphs.....	27,000	" Hacienda.....	1,666,510
Other receipts.....	123,000	" Army and Navy.....	2,384,837
Total.....	6,275,197	Total.....	5,91,958
		Surplus.....	383,238

Peru has a considerable public debt, divided into internal and external. The internal liabilities (1888) were estimated officially at over 109,287,000 soles, excluding 83,747,000 soles paper money, the paper sole being equivalent to only 2½d. The outstanding foreign debt is made up of two loans, contracted in England in 1870 and 1872:

Foreign Loan.		Outstanding Principal.
Railway 6 per cent. loan of 1870.....		£11,141,550
" 5 per cent. loan of 1872.....		20,487,500
Total.....		£31,579,080

The two loans above were secured on the guano deposits (now in possession of Chile) and on the general resources of the republic.

No interest has been paid on the foreign debt of Peru (which was held chiefly in England) since 1876. An arrangement was made in 1885 with Chile by which a percentage of the guano deposits should be paid as interest to the bondholders; and a small amount was transmitted to England in 1883, but it was not till January, 1890, that the bondholders' claims were settled by an arrangement with the Chilean government securing certain guano deposits, the estimated value of which is 2,250,000l. The interest arrears of Peru amounted in 1889 to £22,998,651. In January, 1890, what is known as the Grace-Donoughmore contract was finally ratified. By this the English council of foreign bond-

* A sole is of the nominal value of four shillings sterling, or \$1.25; the real value is generally less.

holders released Peru of all responsibility for the 1870 and 1872 debts, on condition that the bondholders had ceded to them all the railways of the state for 66 years. The bondholders undertake to complete and extend the existing railways.

DEFENSES.—The army of the republic is composed of six battalions of infantry, numbering 2,400 men; of two regiments of cavalry, numbering 600 men; of two brigades of artillery, numbering 500 men; and of a gendarmerie of 2,400 men, forming a total of 5,900 men.

The Peruvian navy now consists of three steamers.

COMMERCE.—The foreign commerce of Peru is chiefly with Great Britain, and with Germany during recent years; it is carried on from several ports, of which the principle are Callao, Paita, Eten, Salaverry, Chimbote, Pisco, Mollendo, Arica, and Iquique. According to the "Peruano" the value of the imports for 1887 was 8,658,531 soles, and the exports 8,872,287 soles. Of the import value 7,075,079 soles and of the export value 4,032,185 soles passed through the port of Callao. The statistics of imports and exports for 1888 have not been published, but the receipts to the Callao custom house amounted in that year at 3,081,694 soles, whilst the corresponding receipts in 1887 amounted to 2,876,387 soles. The chief exports were, sugar, 1,944,629 soles; wool, 762,288 soles; caoutchouc, 444,397 soles; cotton, 415,590 soles; coca, 369,360 soles.

Chile now possesses the province of Tarapaca, where are large nitre deposits.

The guano and nitre deposits, the former to a great extent exhausted, are actively worked.

Peru has numerous gold and silver mines. The most important silver mines are situated in Huayllura, Palmaderas, Montes Claros, Carabaya, Jauli, Castrovirredera, Salpo, Ancastis, Chilete, and the Cerro de Pasco. Their produce amounted to 1,395,936 ounces in 1874; to 1,357,432 ounces in 1875; to 1,358,792 ounces in 1876; to 1,427,592 ounces in 1877, and to 1,771,710 ounces in 1884.

SHIPPING AND NAVIGATION.—In 1888, 460 vessels of 425,964 tons, entered the port of Callao, besides 816 coasting vessels of 8,806 tons. The port of the Paita was visited by 178 vessels in 1887; that of Mollendo in 1888 by 222 vessels of 293,185 tons.

The merchant navy of Peru in 1888, consisted of 30 sailing vessels of 6,265 tons, which exceeds that of 1887 by 19 vessels and 1,849 tons; and it is expected that the increase will be progressive, as according to a concession contained in the law, foreigners are allowed to own vessels carrying the Peruvian flag.

INTERNAL COMMUNICATIONS.—In 1889 the total working length of the Peruvian railways was reported as 1,625 miles. The Peruvian railways, including those ceded to Chile, cost about 36 million sterling.

The length of telegraph lines in 1878 was 1,564 miles. The telegraph cable laid on the west coast of America has stations at Paita, Callao, Lima, and Mollendo, and thus Peru is placed in direct communication with the telegraphic system of the world. A telephone system is in operation between Callao and Lima.

RECENT EVENTS.—In January 1890, the senate approved the financial loan named above. In February the ministry resigned and a new cabinet was formed. In August a new president was elected, and the government was overturned, a new ministry being formed, with Señor Valcárcel as premier. It was reported that the ex-Dictator, Gen. Pierola, had escaped (Nov. 3.) from the imprisonment to

which he had been consigned on a charge of sedition.

PERU, a city of Illinois. See *Britannica*, Vol. XVIII, p. 679.

PERU, a city, the county-seat of Miami county, Ind., on the Wabash River, fifteen miles east of Logansport. It is an important manufacturing center. Population in 1890, 6,731.

PERUVIAN ARCHITECTURE. Although the buildings of Peru were erected probably about the 12th century, A. D., they possess an extraordinary likeness to those of the Pelasgi in Europe. This resemblance arises probably from the circumstance that both nations used bronze tools, and were unacquainted with iron. The Peruvian walls are built with large polygonal blocks of stone, exactly like what we call "Cyclopean masonry." The jambs of the doorways slope inwards, like those of Etruscan tombs, and have similar lintels. The walls of Cuzco are good examples of this style. It is further remarkable, that these walls are built with re-entering angles, like the fortifications which were adopted in Europe only after the invention of gunpowder.

PESHTIGO, a village of Wisconsin, on Peshtigo River, near Green Bay. It contains a large number of mills, and has an active trade in lumber.

PETALUMA, a town of California, on Petaluma Creek, about 40 miles north of San Francisco, and connected with it by a line of steamboats. It is an important center of agriculture and stock-raising. Wine is produced in abundance. Population in 1890, 3,686.

PETARD, an instrument for blowing open gates and demolishing palisades. It consists of a half-cone of thick iron filled with powder and ball; this is firmly fastened to a plank, and the latter is provided with hooks, to allow of its being attached securely to a gate. The engineers attached the petard, lighted the slow-match by which it was to be fired, and fled. When the explosion took effect, a supporting column charged through the breach, while the defenders were yet in consternation.

PETER. See *Britannica*, Vol. XVIII, pp. 693-697.

PETERBOROUGH, a village of New Hampshire, on Contoocook River, eighteen miles east of Keene. It contains a number of factories, foundries, and cotton-mills.

PETERBOROUGH, a town, the county-seat of Peterborough county, Ontario, on the Ontonabee River. See *Britannica*, Vol. XVII, p. 775.

PETER, EPISTLES OF. See *Britannica*, Vol. XVIII, pp. 697-98.

PETERMANN, AUGUST HEINRICH, a German geographer of great note, born in Prussian Saxony, in 1822, died in 1878. He assisted Prof. Berghaus in the preparation of his physical atlas; prepared the maps for Humboldt's *Asie Centrale*; in 1845 went to Edinburgh to superintend the English edition of the *Physical Atlas*; in 1847 went to London, where he became a member of the Royal Geographical Society, and contributed to the *Athenæum*, *Encyclopædia Britannica*, etc. In 1854 he returned to Germany, and became director of Justus Perthes' geographical institution in Gotha. In 1855 he began the publication of his celebrated *Mittheilungen*; he was much interested in several African and Arctic expeditions; and in 1876 he visited the United States.

PETERS, CHRISTIAN FRIEDRICH AUGUST (1806-1880), a German astronomer. He was noted for his valuable investigations of the motions of the fixed stars; was long the editor of the "Astronomische Nachrichten," and director of the Altona Observatory.

PETERS, CHRISTIAN HENRY FREDERICK, an eminent American astronomer, born in Germany in 1813, died in 1890. He graduated at Berlin; traveled for some years, and settled in the United States; became connected with the Coast Survey, and in 1858 with Hamilton College, where he taught astronomy and had charge of the Litchfield Observatory; was chief of the transit of Venus party to New Zealand in 1874. As director of the Litchfield Observatory, which he brought to a high state of perfection, he recorded more than 20,000 spots on the sun, and catalogued some 16,000 zodiacal stars. He made extensive investigations concerning comets; and was known to the general public as the discoverer of a very large number of asteroids.

PETERS, RICHARD, born in Philadelphia in 1744, died in 1828. He was a lawyer, a Revolutionary officer, member of Congress, United States District Judge, and one of the first agriculturists in America to use plaster of Paris as a fertilizer.

PETERS, SAMUEL ANDREW, an American divine and Tory of the Revolutionary period, born in Connecticut in 1735, died in 1826. He is chiefly remembered for his satirical *History of Connecticut*, and is the "Parson Peter" of Trumbull's Hudibrastic political poem *McFingal*.

PETERS, SAMUEL RITTER, born in Ohio in 1842. He enlisted in the army in the fall of 1861, and was mustered out in June, 1865, having held successively the offices of sergeant, 2nd lieutenant, 1st lieutenant, adjutant, and captain in the 73rd O. V. V. I.; was elected in the fall of 1874 to the State senate of Kansas; appointed in March, 1875, judge of the 9th judicial district; in the fall of 1875 was elected to the same judgeship without opposition, and reelected in 1879, and was a member of Congress from 1883 to 1891.

PETERSBURG, a village, the county-seat of Menard county, Ill., on the Sangamon River twenty miles northwest of Springfield. It is the center of an extensive timber district, and has an abundant water-power and several mills.

PETERSBURG, a village, the county-seat of Pike county, Ind., near the White River, twenty miles southeast of Vincennes. It contains a number of manufactories.

PETERSBURG, a city of Virginia. Population in 1890, 23,317. See *Britannica*, Vol. XVIII, p. 702.

PETERSFIELD, a parliamentary borough and market-town in Hampshire, England, twenty-three miles northeast of Southampton, and fifty-five miles southwest of London. It is a pleasant country town, and contains a Norman parish chapel of the 12th century, and an educational institution, called Churher's College. An equestrian statue of William III., once richly gilt, stands in the market-place. Population, 6,104.

PETERSON, CHARLES J., an American writer and publisher, born in Philadelphia in 1819, died in 1887. He wrote numerous biographies of military and naval heroes, and a number of historical and fictitious works; was editor and proprietor of "Peterson's Magazine."

PETIGRU, JAMES LOUIS, an American lawyer, born in South Carolina in 1789, died in 1863. He was attorney-general of his native State, and is distinguished as the codifier of its laws. The codification was completed in 1862.

PETITION. See *Britannica*, Vol. XVIII, pp. 703-05. In the United States the right of petition was formally recognized by a constitutional amendment which forbids Congress to make any law prohibiting "the right of the people peaceably to assemble, and to petition the Government for a redress of grievances."

PETOFI, SANDOR, a Hungarian poet and patriot, born in 1822, probably killed in the battle of Szegedvár in July, 1849. His numerous songs (the most popular of which "Now or Never," gave the first impulse to the Hungarian uprising in 1848) rank very high as specimens of lyrical poetry.

PETOSKEY, a village of Michigan, on Lake Michigan, sixty miles north of Traverse City. It has a good water-power from Bear River, and manufactures lumber and lime.

PETROLEUM. See *Britannica*, Vol. XVIII, pp. 712-20. See also **MINING**, in these Revisions and Additions.

PETROLEUM PIPE-LINE, a continuous series of iron pipes through which oil is pumped from the place of supply to the refinery, to market, or to the place of export. The transportation of crude petroleum is thus effected on an immense scale in the United States, where there is an aggregate of many thousand miles, one line extending in opposite directions from the oil-region of Pennsylvania to New York and to Chicago.

PETROLIA, a borough of Pennsylvania, about forty miles north of Pittsburgh. It has extensive manufactories connected with the oil-trade.

PETSH, or IPEK, a pleasant town of European Turkey, in Albania. It stands on the Bistritza, or White Drin, thirty-five miles northeast of Scutari. Population, 8,000.

PETTENKOFER, MAX VON, born in Germany in 1818, became professor of chemistry at Munich, in 1847, and professor of hygiene in the Bavarian University in 1865. He has written many valuable works on hygiene.

PETTIE, JOHN, a Scotch painter, born in 1839. He is noted for his life-like scenes of old English life. He became a Royal Academician in 1873, in place of Sir Edwin Landseer. Many of his works have been engraved.

PETTIGREW, JAMES BELL, a Scotch surgeon and anatomist, born at Roxhill in 1834. He is the author of the article **FLIGHT, FLYING MACHINES**, in the *Britannica*, Vol. IX., pp. 308-23, and of a popular work on *Animal Locomotion*.

PETTIGREW, RICHARD FRANKLIN, an American statesman, born at Ludlow, Vt., July 1848. He removed with his parents to Evansville, Rock county, Wis., in 1854; was prepared for college at the Evansville Academy, and entered Beloit College in 1866, where he remained two years; was a member of the law class of 1869, University of Wisconsin; went to Dakota in July, 1869, in the employ of a United States deputy surveyor as a laborer; located in Sioux Falls, where he engaged in the surveying and real-estate business; opened a law office 1875; was elected to the Dakota legislature as a member of the council in 1877, and reelected in 1879; was elected to Congress in 1881 as a delegate from Dakota Territory; to the Territorial Council in 1884; United States Senator, under the provisions of the act of Congress admitting South Dakota into the Union, 1889-95.

PETWORTH, or SUSSEX MARBLE, a thin layer of limestone, composed of the shells of fresh-water *Paludina*. It has been long, but not extensively used for ornamental purposes. A polished slab of it was found in a Roman building at Chichester, and pillars formed of it exist in the cathedrals of Chichester and Canterbury.

PEWAUKEE, a village of Wisconsin, on Pewaukee Lake, twenty miles west of Wiscousin. It has a number of manufactories.

PEZENAS, a manufacturing town of France, in the department of Hérault, on the left bank of the river of that name, twenty-five miles west-southwest of Montpellier. It stands in a district remark-

able for its beauty, and so well cultivated as to have received the name of the Garden of Hérault. The vicinity produces excellent wine, and woolen and linen goods are manufactured. It is known as one of the principal brandy markets of Europe. Population, 6,824.

PFEIDERER, OTTO, a German theologian, born at Stettin in 1839. In 1868 he became pastor at Heilbronn, Württemberg, and in 1871 professor of theology at Jena. In 1875 he was called to Berlin as professor of systematic theology. He has published *Die Religion, ihr Wesen und ihre Geschichte* (1869); *Moral und Religion; Religions-Philosophie auf geschichtlicher Grundlage* (1886); *Grundriss der christlichen Glaubens- und Sittenlehre* (1880).

PHAGEDÆNA, a variety of ulceration in which there is much infiltration, and at the same time rapid destruction of the affected part. The sore presents an irregular outline, and a yellowish surface; it gives off a profuse bloody or ichorish discharge, and is extremely painful. It usually attacks persons whose constitutions are vitiated by scrofula, by the syphilitic virus, by the abuse of mercury, and by intemperance. It frequently appears in the throat after scarlatina in a severe form. If relief is not afforded by the internal administration of opium (to allay the pain), and of quinia, or some other preparation of bark, wine, beef-tea, etc., to improve the tone of the constitution, together with astringent and sedative local applications, recourse must be had to the destruction of the part by strong nitric acid, or some other caustic.

PHARSALUS, now FERSALA, anciently a town of Thessaly, south of Larissa, on the river Enipeus, a branch of the Peneus (now the Salambria), and historically notable mainly for the great battle fought here between Cæsar and Pompey, August 9, 48 B. C.

PHEASANT-SHELL (*Phasianella*), a genus of gasteropodous molluscs of the family Turbinidae, of which the shells are much valued for their beauty, and when they were rare, in collections, were sometimes sold for extraordinary prices. They are now comparatively cheap and plentiful, being found in great numbers on some parts of the Australian coast.

PHELAN, JAMES, born in Aberdeen, Miss., December 7, 1865. He removed with his father, the Confederate senator, to Memphis in 1867; received a private-school education; in 1871 attended the Kentucky Military Institute, near Frankfort; in 1874 entered the University at Leipzig, Saxony; after Michaelmas, in 1875, received private instruction in Latin, from Richard Sachse, Oberlehrer in the Gymnasium zu St. Thomas; took the degree of doctor of philosophy in February, 1878; returned to Memphis; studied law, and began the practice in 1881; was elected to the 50th Congress, and was reelected to the 51st Congress.

PHELPS, a village of New York, eight miles northwest of Geneva. It contains important manufactures of machinery, malt, peppermint, and other essential oils, and has valuable deposits of plaster of Paris.

PHELPS, AUSTIN, theologian, born at Brookfield, Mass., in 1820, died in 1890. He was made pastor of the Pine Street Congregational Church at Boston in 1842, and professor of sacred rhetoric in the Andover Theological Seminary in 1849; and was relieved from this position in 1884. He published *The Still Hour; Hymns and Choirs; The New Birth; Theory of Preaching; Men and Books; English Style of Public Discourse*; and time-books for churches and Sunday schools. His writings are conser-

vative, yet show broad views, and are clothed in pure style.

PHELPS, ELIZABETH STUART, an American authoress, daughter of Moses Stuart, born at Andover in 1815, died in 1852. She was married to Prof. Austin Phelps in 1842. She wrote *Sunny Side* and other tales. Her daughter, ELIZABETH STUART PHELPS, author of *The Gates Ajar*, and *Beyond the Gates*; born at Andover in 1844, has written many popular tales and poems. She was married to Rev. H. D. Ward in 1888.

PHELPS, JOHN W., an American soldier, born in Vermont in 1813, died in 1885. He graduated at West Point; served in the Florida, Mexican, and civil wars; became brigadier-general and accompanied General Butler's expedition to New Orleans; armed the negro slaves as soldiers, was declared an outlaw by the Confederate government, was not sustained by the United States Government, and resigned his commission. When the negroes were finally armed by the Government, a major-general's commission was offered to him and declined. He was afterwards president of the Vermont State teachers association; was an active anti-mason, and wrote several books.

PHELPS, OLIVER, an American merchant, born in Connecticut in 1749, died in 1809. He engaged very heavily in land speculation in western New York; opened a land office in Canandaigua, which is said to have been the first in America; invented the system of townships and ranges now in use by Government surveyors; held many positions of trust, and promoted many public enterprises.

PHELPS, WILLIAM WALTER, Congressman, born in New York City in 1839. He became a prominent lawyer and director of several important financial institutions; member of Congress in 1873; minister to Austria in 1881; member of Congress in 1882, and is at present (1891) minister to Germany.

PHIGALIAN MARBLES, the name now given to the sculptured frieze taken from the cella of the temple of Apollo at Phigalia in Arcadia in 1814, and transferred to the British Museum. It represents the contests between the Centaurs and Lapithæ. The Phigalian temple of Apollo is, next to the Theseum at Athens, the most perfect architectural ruin in all Greece; but owing to its sequestered position at the head of a lonely and rocky glen among the Arcadian hills, it long remained unknown in modern times, except to the shepherds of the district; and to the same circumstance it probably owes, in part, its preservation. Chandler first visited and described it in 1765.

PHILADELPHIA, CITY OF. For extended and general article on the city of Philadelphia see *Britannica*, Vol. XVIII, pp. 736-741. The census of 1890 reported the area at 129.31 square miles; population, 1,046,964. The progress of population during the last three decades is shown by the following census returns:

	Population	Increase.
Census, 1860.....	565,639	
Census, 1870.....	674,022	108,498
Census, 1880.....	847,370	173,348
Census, 1890.....	1,046,964	199,794

Should the total increase of the city population and suburban population be as great during the present decade as it was during the decade closing in 1890 the grand total will exceed two millions.

If the suburban population of Philadelphia reported in the census of 1890 be added in order to show an equitable comparison between Philadelphia and certain other cities that have made recent considerable additions to their territory, and whose population reported in totals of 1890, was

inclusive of those additions, the following table would be furnished:

	Pop. 1890.	Increase.
Philadelphia City Proper.....	1,046,964	199,794
Montgomery Co., Pa.....	123,290	26,796
Bucks Co., Pa.....	70,515	1,959
Delaware Co., Pa.....	74,683	18,582
Gloucester Co., N. J.....	28,649	2,763
Middlesex Co., N. J.....	61,754	9,468
Burlington Co., N. J.....	58,528	3,126
Camden Co., N. J.....	87,687	24,439
Total "Greater Philadelphia"	1,552,170	287,233

DENSITY OF POPULATION.—Philadelphia has a population of 8,091.54 to the square mile. Its area equals 82,809.62 acres, with a population of 12.64 to the acre.



CITY BUILDINGS, PHILADELPHIA.

Chicago has an area of 160.57 square miles, with an average population of 6,849.66 to the square mile, or 102,764.80 acres, with a population of 10.70 to the acre.

New York City has an area of 40.22 square miles, with an average of 37,675.31 to the square mile; or 25,740.80 acres, with an average population of 58.87 to the acre.

MANUFACTURING ESTABLISHMENTS.—In manufacturing industries, Philadelphia holds the highest rank of any city in America. Among the most prominent branches of manufactures are the following: Boots and shoes; bread and bakery products; carpets and rugs; clothing; furniture; machinery; tin, copper and sheet-ironware; and most kinds of woollen goods.

At this writing (October, 1891), the census returns of 1890, relating to manufactures, have not been completed. Those for 1880 reported for the city of Philadelphia the following summaries:

Number manufactories.....	8,1567
Amount capital.....	\$187,48,857
Average number of hands employed.....	185,527
Wages paid during the year.....	\$64,265,966
Cost of materials.....	199,155,477
Value of products.....	\$24,342,937

EDUCATIONAL FACILITIES.—The public school system of the city comprises more than 400 schools, affording an education to over 100,000 pupils; besides which there are high and normal schools and colleges, and the University of Pennsylvania. There are also numerous hospitals and other charitable institutions, and several libraries, of which the Mercantile and Library Company of Philadelphia contain over 100,000 volumes each.

Among its recently erected educational buildings, is the Drexel Industrial Institute, costing about \$500,000, and completed in the autumn of 1891. The donor, Mr. Anthony J. Drexel, of the well-known banking house, provides also an en-

dowment fund of \$1,000,000 to keep the institute in permanent operation. The building is located at the northeast corner of 32nd and Chestnut streets, and occupies three sides of the square. It is three stories high, 200 square, and fronts on Chestnut street.

The special feature of the interior is a large central hall, nearly 100 feet square, and reaching to a glass roof on the ceiling line of the third floor. From the northern or rear end of this hall a grand marble stairway leads to the upper floors. Broad galleries run around the inside court on the second and third floors, giving entrance to the various rooms, all of which are lighted from the outside. On the first floor are the museum, 56 by 70 feet; the library, 56 by 70 feet; and reading room, 50 by 40; a small lecture hall, 40 by 56; and, distinct from other parts of the building, the great lecture hall, 56 by 154 feet, which will seat about 2,000 people. There are twenty-four class-rooms in the building, amply provided with cloak-rooms, wash-rooms, etc., and as each of these will contain, on the average, at least 100 pupils, there will be room for 2,400 in the building at once. In the middle of the front on the top floor is the gymnasium, a room about

60 feet square, which will, of course, be fitted up with all necessary appliances.

On Dec. 1, 1888, Mr. Isaiah V. Williamson of Philadelphia conveyed by deed of trust to a board of seven trustees, for educational purposes, property valued at \$5,000,000. The conditions of the trust call for the establishment of a comprehensive system of trade schools in which boys are to have free instruction, under the most competent teachers, in any trade they prefer. A tract of ground near Philadelphia, not larger than three hundred acres in extent, and not to exceed in price four hundred dollars an acre, was to be acquired, and on this land the requisite number of substantial buildings were to be put up, designed both for class-room and dormitory purposes. Dwellings were also to be built for the instructors, and funds set apart for their support. If the five millions of the original gift prove to be inadequate for these various objects, Mr. WILLIAMSON has let it be understood that he is ready to increase the endowment to ten or twelve million dollars. Hence, in its larger possibilities, the gift is one of the most stupendous in all history. Possibly no benefaction on record is greater, except the foundation of Leland Stanford Junior University by Senator Stanford of California.* See WILLIAMSON, ISAIAH V., in these Revisions and Additions.

POPULATION OF PHILADELPHIA BY WARDS.—The following table, taken from the final official returns of the census of 1890, shows the population of the city by wards, the total population being 1,046,964:

Wards	Population.	Wards.	Population.
1	53,882	18	29,164
2	31,563	19	55,545
3	19,925	20	44,880
4	20,384	21	26,390
5	16,987	22	45,329
6	8,712	23	35,294
7	30,179	24	42,556
8	16,971	25	35,945
9	9,791	26	62,138
10	21,514	27	32,905
11	12,053	28	46,390
12	14,750	29	64,759
13	17,923	30	30,614
14	20,737	31	32,974
15	52,705	32	30,050
16	17,087	33	33,171
17	19,516	34	23,721

ARCHITECTURAL IMPROVEMENTS.—During the last few years new ideas of architecture have wrought surprising changes in the buildings of Philadelphia.

The beginning of this advance apparently dated with the Centennial in 1876. A great number of massive and splendid public and business edifices are now the immediate result. Among them are: the new City Hall, one of the finest buildings in the United States; the Drexel Building (not the institute mentioned above); Brown Buildings; Union Trust Company's buildings; and the offices of the Pennsylvania Railway and the Girard and Penn Mutual Insurance Companies. The advance is also seen in the architectural designs and finish of many of the new palatial residences of the private citizens.

OTHER MISCELLANEOUS STATISTICAL ITEMS.—Philadelphia had at the date of the census of 1890, 750 paved streets out of a total of 1,151 streets, with an average width of 50 feet, with an average yearly cost of construction of \$637,550; 1,150 miles of streets lighted by 25,993 street lamps (of which 1,045 were electric), at an average annual cost of \$636,605; an unlimited supply of water, with 11 reservoirs and a total capacity of 891,482,454 gal-

lons, 1,151 miles of street sewerage; a police force of 1,717 men employed at an average cost of \$1,000,000; and a fire-department of 521 men, with 180 horses, kept up at an average annual expense of \$625,000.

A CONDENSED CHRONOLOGICAL HISTORIC OUTLINE.

City planned by William Penn and called Philadelphia ("Brotherly Love")	1682
"American Weekly Mercury" started	1719
The "Pennsylvania Gazette," founded by Franklin, started	1729
Philadelphia Library (oldest in the city) founded by Benjamin Franklin	July 1, 1731
Benjamin Franklin arrives in Philadelphia, 1723, and thenceforward for 67 years (until his death, in 1790) makes the city his home.	
Poor Richard's Almanac ("The Way to Wealth") started by Franklin	1752
Franklin organizes the first association for extinguishing fires.	1758
Franklin discovers and announces the identity of electricity and lightning	1752
First Continental Congress met in Philadelphia.	Sept. 4, 1774
Declaration of Rights adopted	Oct. 14, 1774
Declaration of Independence adopted and read from a stand in the State House yard by John Hopkins	July 4, 1776
General Howe takes Philadelphia	Sept., 1777
Battle of Germantown	Oct. 3, 4, 1777
Federal Government adopted by Congress	Nov., 1777
In consequence of the disastrous battles of Brandywine and Germantown, the British army had possession of this city from	Sept., 1777, to June, 1778
British troops quit Philadelphia	June 28, 1778
The convention that formed the present Constitution of the United States met in Philadelphia	May, 1787
Washington, the first President of the United States, resided in a building which stood in Market Street one door east of Sixth Street, south side.	
Death of Franklin	April 17, 1790
The steamboat of John Fitch began to make regular trips on the Delaware	1790
The yellow fever visits Philadelphia, and carries off more than 4,000 persons out of a population of a little over 40,000, of whom half, it was thought, had fled the city	1793
Washington's last address to Congress	Dec. 7, 1796
John Adams inaugurated President	March 4, 1797
The yellow fever again visited Philadelphia, but was not so fatal as in 1793	1798
The Asiatic cholera ravaged the city and swept off 771 victims in the summer of	1832
The Pennsylvania Hall, belonging to the Abolitionists, was attacked by a mob and burned, the Shelter for colored Orphans fired, and the negro quarters attacked	1838
The city was disquieted by riots in the northern and southern suburbs, caused by jealousy between the Protestants and Catholics. The military were called out and several lives were lost	1844
Girard College, the gift of Stephen Girard, the education of orphan boys, costing \$2,000,000, was opened	1846
The Asiatic cholera renewed its ravages, but less fatal than on its first occurrence	1849 and 1854
The districts of Moyamensing, Southwark, Northern Liberties, Spring Garden and West Philadelphia, and the boroughs and townships of the entire county, were consolidated with the city proper	1854
A great fair was held in Logan Square, under the auspices of the Philadelphia branch of the United States Sanitary Commission, affording more than a million dollars for the relief of the sick and wounded soldiers	1864
Dr. James Rush left \$1,500,000 for the erection of a building and the support of a free public library	1869
New City Hall, at the intersection of Broad and Market Streets, covering an area (exclusive of court-yards) of nearly four and a half acres, was commenced	1871
The city was visited by a great epidemic of small-pox	1872
The Centennial Exhibition was held on grounds at the southwest extremity of Fairmount Park (one hundred years after the Declaration of Independence was issued). This was the best attended and in many respects the most successful of all the great International Expositions	1876
Second Presbyterian Ecumenical Council, representing 52 ecclesiastical bodies, held	Sept. 22-Oct. 2, 1880
General Conference of the Methodist Episcopal church held	May 1-28, 1884
Interstate Military camp opened on Centennial grounds at Fairmount Park	July, 1885
The great educational gift of \$5,000,000 by Mr. Isaiah V. Williamson to the city, conveyed in trust	Dec. 11, 1888
New Drexel Industrial Institute, erected at a cost of \$500,000, and presented to the city with an endowment of \$1,000,000 by Anthony J. Drexel, was completed	1891

*At this writing, October, 1891, the institution is in progress.

PHILIP, a chief whose native name was Pometacorn. He was the son of Massasoit, and is famous in New England colonial history as the Indian leader in "King Philip's War." He died in 1676.

PHILIPPEVILLE, a thriving town and seaport of Algeria, in the province of Constantine, forty miles north-northeast of the city of that name, on the Gulf of Stora, between Cape Boujaroun and Cape de Fer. In the vicinity are quarries of the famous Filfila marble. A harbor has recently been constructed. Population, 12,191.

PHILIPPIANS, EPISTLE TO THE. See *Britannica*, Vol. XVIII, pp. 746-748.

PHILIPPINS, a Russian sect, so called from the founder, Philip Pustoswiät, under whose leadership they emigrated from Russia in the end of the 17th century. They are a branch of the Raskolniks, of which there are two classes—one which recognizes popes (or priests); the other, which admits no priest or clerical functionary. The Philip-pins are of the latter class. They refuse oaths, and decline to enter military service.

PHILIPPOTEAX, FELIX EMMANUEL HENRI (1815-84), a French artist, who became famous as a painter of battle-pieces, and is popularly known in this country through his remarkable panorama of the *Siege of Paris*.

PHILIPPOTEAX, PAUL, a French historical painter, born at Paris in 1846. He assisted his father in preparing the *Cyclorama of the Siege of Paris*, and made a similar representation of the battle of *Gettysburg*, which has been exhibited in New York, Philadelphia and other cities. In 1888 he exhibited a series of thirty large paintings illustrating the career of Gen. Grant.

PHILIPSBURG, a borough of Pennsylvania, on the Moshannon River, twenty miles north of Tyrone. It contains a number of factories, mills, and machine-shops.

PHILIPSTOWN, a town of Ireland, forty-seven miles southwest of Dublin. Its charter dates from 1567.

PHILISTINES. See *Britannica*, Vol. XVIII, pp. 755-757.

PHILLIMORE SIR ROBERT JOSEPH, an English jurist, born at London in 1840, died in 1885. He was made chancellor of the dioceses of Chichester and Salisbury, and in 1867 he became judge of the High Court of Admiralty, and of the Arches Court of Canterbury. On the re-organization of the courts he was nominated judge of the admiralty and probate division of the High Court of Justice, which office he held till his death. His *Commentaries upon the International Law* (4 vols.) have become famous. He also published *Memoirs of George Lord Littleton*; *Ecclesiastical Law of the Church of England*, and an annotated translation of *Lessing's Laocöon* (1874).

PHILLIPS, WENDELL, an American orator and reformer, born in Boston, Mass., Nov. 29, 1811, died there Feb. 2, 1884. He was the head of the great anti-slavery party of Boston. He owed his first impulse toward the cause to which his life was devoted to the suit occasioned by the "Broadcloth Club" of gentlemen, when it broke into the meeting of the Women's Anti-Slavery Society in Boston in 1835, and made his first mark as an orator in 1837, and from that time he took the rank of next to the first, if not the first orator, in America.

PHILLIPS, WILLARD, born in Massachusetts in 1784, died in 1873. He was a lawyer in Boston, a judge of probate, and the author of works on patents, insurance, and on political economy.

PHILLIPSBURG, a city of New Jersey, on the Delaware River, opposite Easton, Pa. It is an important manufacturing town, and has valuable de-

posits of limestone and iron ore. Population in 1890, 8,644.

PHILPOTT, HENRY, an English divine, born at Chichester in 1807. He was educated at Cambridge; ordained in 1831; was chaplain to the late Prince Consort; was consecrated bishop of Worcester in 1851, and resigned in 1890.

PHILPOTTS, HENRY, an English bishop, born at Gloucester in 1778, died at Bishopstoke in 1869. He was made bishop of Exeter in 1830, and was the official leader of the High Church party in its controversies of that period. In 1849 he refused to institute the Rev. Mr. Gorham in a church living on the ground of his denial of baptismal regeneration. The privy council decided in Gorham's favor, and the archbishop of Canterbury carried out this decision. Upon this Bishop Philpotts anathematized the archbishop.

PHIPS, SIR WILLIAM, a colonial governor of Massachusetts, born in Maine in 1661, died in 1695. He was knighted and made high-sheriff of New England for having recovered an immense treasure of silver of one of the ships of the Spanish plate-fleet wrecked off the Bahamas.

PHLEGETHON, "the Flaming," a river of the infernal regions, whose waves rolled torrents of fire. Nothing would grow on its scorched and desolate shores. After a course contrary to the Cocytus it discharged itself, like the latter stream, into the Lake of Archeon.

PHOENIX, a city of Arizona, capital of the Territory, county-seat of Maricopa county, situated on Salt River, about 225 miles northeast of Yuma. It is the trade-center of a rich agricultural and mining district, and contains a number of mills.

PHOENIX, a village of New York, on Oswego River, fifteen miles north of Syracuse. It has an excellent water-power and a number of mills and other manufactories.

PHOENIXVILLE, a borough of Pennsylvania, on Schuylkill River at the mouth of French Creek, about twenty-eight miles northwest of Philadelphia. It is the seat of a seminary, and contains several mills, factories, and furnaces. Population in 1890, 8,514.

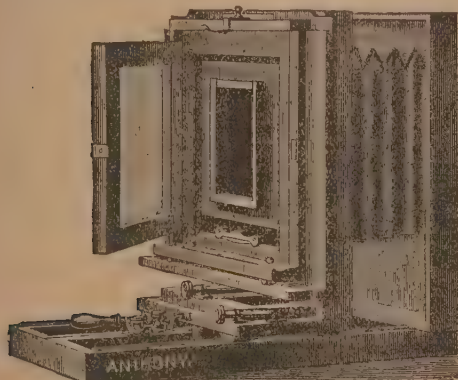
PHOSPHATES. See *Britannica*, Vol. XVIII, pp. 815-819. The most important mineral containing phosphorus is apatite (see this article in these Revisions and Additions). It consists mainly of "phosphate of lime," and is found on the Island of Sombbrero, in the West Indies. Lime phosphate is an essential element of plant-food. It is therefore much used as the basis of artificial fertilizers. It is also the main constituent of guano, and is found in marls, but only in small proportion.

Phosphate rock exists abundantly in South Carolina. Over the marl-beds there is found a stratum of hard, rounded stones, from the size of a potato to a diameter of several feet. These stones were formerly thrown away as useless. But in 1867 it was discovered that they contain from 50 to 60 per cent. of phosphate of lime.

In 1886, the quantity of phosphate rock taken from the navigable rivers of South Carolina was 191,174 tons. It pays a royalty to the State. Most of this river rock is shipped to other States. The phosphate factories of South Carolina use exclusively land rock. Forty companies are engaged in crushing this rock and manufacture it into fertilizers.

PHOTOGRAPHY, RECENT PROGRESS IN. At the convention of photographers held at Buffalo in August, 1891, Mr. Arthur H. Elliott, Ph. D., editor of "Anthony's Photographic Bulletin," (published in New York) made the following report on the progress of photography during the past year:

Beginning with the apparatus of the professional photographer, we do not find any important advances. The cameras that were used a year ago hold their places in the estimation of the practical man. In the matter of hand cameras we note some quite unique improvements. In this respect the new film camera called the Kamaret is undoubtedly a marked advance in the utilization of the space within the box to secure the most compact disposition of the parts. The roll is so arranged that it occupies the space between the cone of rays from the lens and the side of the box. By this method of disposition, space hitherto not used has been made available, and the most compact hand camera now in the market is the result. Coming to the use of plates in hand cameras, we must give the palm to the new magazine camera of Anthony. This embodies several new devices that are quite ingenious. First, the plates are made to come into focus automatically by means of a spring, and after exposure a single push on a button takes the exposed plate out of the way into a well, leaving another plate in place for further use. Second, after all the plates in the magazine of the camera have been exposed, the camera may be loaded up again by attaching a reservoir box to it containing a new lot of plates, which are readily transferred



FITTED WITH BENSTER HOLDER.

to the body of the camera by the use of a couple of slides. The empty box can now be used to hold the exposed plates in the camera, and these are removed by attaching it to the bottom of the camera, and with the movement of two slides the plates fall out to give place to those that are to be exposed afterwards.

We must confess that this is a decided advance in the construction of hand cameras. Yet another hand camera must take a little of our attention for a moment. This is the Hetherington. Here we have a camera using plates that are arranged pretty much as the leaves of a book. As each plate is exposed it is turned down out of the range of the lens, just as you would turn down the leaf of a book if it was stood up on its back closed. Each plate is turned down; a spring brings a new one into place. This is a most ingenious piece of apparatus; but as soon as the plates are all exposed you have to resort to a dark room to refill the plate-holders.

In the matter of lenses, by far the most important step has been taken by Carl Zeiss in the adaptation of the Jena glass to photographic lenses, and the construction of a lens in which the chemical

and visual rays come to one and the same focus. Yet another improvement is the use of the lenses so corrected that they may be used at very short focus and wide angle without the distortion hitherto encountered in lenses of this character. There is no doubt that this Jena glass, which has done such wonders in the field of microscopy, is destined to teach us some new things in the world of photography.

While on the subject of lenses we must not forget to speak of the efforts of the English lens makers to come to some understanding in the matter of threads and flanges of the lens mounts. Although nothing definite has yet been accomplished, a report on the subject has been approved by the principal English lens makers, and with a little further modification there is no doubt that a uniform screw thread for the lenses of the same size, also a uniform thread for tripod screws, and a uniform system of marking the diaphragms of lenses will be adopted by all the English makers, and probably by those of America, France and Germany. If this can be accomplished, the photographer will be in the same position as the microscopist, in having all his lenses of the same size fit into the flanges on his cameras or into adaptors that also are uniform for all makes of lenses.

While we are noting the novelties in photographic apparatus, a word about the new rival of the photographic operator is worth our attention. We mean the automatic photographing machines, where you put a nickel in the slot and get your picture taken, framed and all. But they are at present not worth more than a word, for all we have seen are easily distanced by the poorest tintype artist that visits the smallest country town. Nevertheless, these machines are the beginning of a series of inventions that will make a likeness of the sitter in front of them, and purely by mechanical motions as certain in their action as those of a clock. At present they are more of a curiosity than an innovation in photographic work.

Since we last met quite a furore has been seen in the matter of color photography. Prof. Lippmann, of France, startled the world with the announcement that he had discovered the secret of taking photographs in their natural colors. After developments proved that he had repeated the experiments of Edmond Becquerel, made twenty-five years before, except that he had used glass plates with greater success. Practically his work is of little value, but it is interesting as a development of the theory of interference in light. The pictures he obtained are of the same character as the colors of the soap bubble in the sunbeam or the film of oil on water.

Working in the same field of research, but with much better experience to guide him, our own Carey Lea has shown us some new wonders in the properties of silver chloride. Indeed, he has discovered that the basis of modern photography, the metal silver, is capable of existing in several distinct colored modifications. The Austrian photographer, Vereszy, who also experimented in the field of color by photography, did work that is but a modification of the work of Carey Lea.

Some means of determining the actinic value of light in its relation to photography has long been a desideratum, and the English experimenters, Messrs. Hurter and Driffield, together with Capt. Abney, have arrived at some interesting results, showing that the exposure determines the gradation of lights and shades in the negative. Incorrect exposure will not give an harmoniously graded negative, and, furthermore, this incorrect exposure cannot be improved by a change of development.

They have devised a method of determining the proper time of exposure, but at present the apparatus is more scientific than practical.

A much more convenient apparatus for the purpose of determining the time of exposure is the neat little actinometer of Ballard, which depends upon the measurement of the actinic power of the light on a subject by finding out how long the photographic, that is the blue and violet rays, take to fade from a phosphorescent tablet that has been exposed to their influence. Its mode of operation is very simple. A small tube, blackened inside, has at one end a tablet of luminous paint, so arranged that it hangs by a hinge which allows it to be exposed on the subject for half a minute. The tablet is then closed over the tube, and by looking into the latter the time of fading to a standard tint, also in the tube, gives a figure that is a measure of the photographic power of the light reflected by the subject. It is practical, and its indications are just as good as the sensitometer with which we determine the rapidity of our dry-plates.

This same actinic power is modified by our use of the diaphragms in the lens. But here also some experiments of the past year have given us some new light. Dr. Michelke, of Germany, has shown that if we reduce the size of the opening in the lens to one-fourth we shall have to increase the time of exposure, not four times, as might be expected, but 20 per cent. more, or nearly five times. By using yet smaller openings we must add still more to the time, and with one thirty-sixth of the opening the time will have to be forty-eight times as long, or an increase of one-third the calculated time for correct exposures with a corresponding larger stop. In a word, if the time of the exposure is correct with a stop of one inch, and it is desired to use a stop of one-quarter of an inch, we must increase the time of exposure, not four times, but nearly five times.

In the field of orthochromatic photography, as it is called, there is not much new to report, but we are very glad to note that our American manufacturers are making some of the best dry-plates to be found anywhere.

There are rumors of the advent of collodion plates that are as rapid as the gelatine dry-plate, but we have not heard of any practical use of these plates. It is stated that at the present time they are twice as costly as the gelatine plates, but it is only a question of time when we shall have them in competition; and for many purposes they may be found of advantage even at double the present prices of dry-plates, notably in photo-mechanical work.

Flash-light photography has many workers and it is constantly being put to good use and its manner of application being improved. Various devices have been employed to overcome the hard shadows that were to be found in the first pictures made by its use. The methods of doing this are in the division of the magnesium powder into a number of small charges rather than using it in one large flash. These charges are fired simultaneously by the use of a number of gas jets that are made to impinge on pieces of gun-cotton on which is placed the magnesium, the projection of the many flames, at the same instant being controlled by some device that regulates the pressure of the gas and increases it at the same moment at every jet. Pictures made by these methods are very hard to distinguish from those made by daylight.

The color of the magnesium light is capable of much modification. And in this respect, may be a most useful adjunct to the orthochromatic plates. Two German experimenters have applied this in

photo-micrography using a mixture of perchlorate of potash with magnesium, chloride of sodium and tartrate of barium, with some excellent results.

The development of the photographic plate has received a good deal of attention during the past year. In the matter of developers there is not very much to report, but quite recently paramidophenol, a substance related somewhat to eikonogen, has been proposed as a new agent. Like eikonogen it is very soluble and it is also rather expensive; but if it is found to have any decided advantage, the chemist will soon find a way to make it cheaply. At the present time it is said to possess good developing powers, and its use gives no stains on the films. Compared with eikonogen and hydroquinone, it oxidizes more rapidly than either. It is consequently more active than these developing agents. But its most important advantage is the fact that it will not color the film and can be used for a large number of plates in succession. It is said that as many as twenty plates may be developed in the same bath without causing the least stain on the negative. From these indications it would appear to be as rapid as pyrogallol without its staining defects.

In connection with the subject of developers, the interesting experiments of Colonel Waterhouse deserve a moment's attention. He has found that by the addition of a very small quantity of thiocarbamide to the developer of eikonogen it is possible to produce a positive image instead of a negative one. This is a matter of small importance to the ordinary photographer, but to those who have to work the photo-mechanical processes it is a saving in the steps to be taken for the production of the final printing plate, for it saves the production of a positive from the usual negative.

Coming now to the printing processes, we must record the revival of the use of gelatine as a substitute for albumen, with more improvements than it has seen in many years. Aristotype paper has made some very important advances during the past year, and if the march of progress is continued it may supplant albumen paper entirely as a basis for the photographic print.

Platinum printing still holds its own with amateurs, and it would be a source of profit to the professional photographer, in the better class of work, if he would but take time to overcome some of the earlier difficulties. In Europe they are far ahead of us in this matter.

A new printing process was presented to the photographers by two English chemists some months ago, which depended for its action upon the change made by light in the chemical structure of a dye-stuff made from the coloring matter known as Primuline. This substance has the curious property of uniting with different organic matter and producing with each one a colored print. If therefore we print in diazo primuline from a star-shaped negative, we can make each of the star rays of a different color, by the use of different organic matters put on as developers in the form of paste. The great drawback to the success of the process is the color of the ground, which is of a bright yellow tint. Up to the present time the inventors have not been able to change this color, but if it is ever accomplished, we shall be in possession of a printing process of great beauty and capable of many variations, this, too, without the use of silver or any other metallic salts, as the substances used are entirely of organic origin.

The application of photography to astronomy continues to give the most wonderful results. Stars unseen by the human eye are detected by the photographic dry-plates. And some recent photo-

graphs made in Sydney, Australia, show that the stars of the milky way are really larger than they appear to the eye through the telescope. This is due to the fact that they emit many blue rays which are invisible to our sight, but whose light affects the photographic plate.

Photo-mechanical printing processes have made important advances in color printing in which they are now producing some of the most beautiful work ever attempted by the aid of light and the printing press, and without the aid of the human hand. In this respect the work of Bierstadt, of New York, surpasses anything of the kind ever attempted before. By the use of colored screens, he takes several negatives of the different colors that make up the painting he wishes to produce by photography, and by means of these he prepares corresponding gelatine surfaces that serve as the basis for the printing of the colors by superposition, as in the lithographic methods. The results obtained are very beautiful and are almost a perfect fac-simile of the original picture. It will be by some such process as this that we shall be able to make, not take, photographs in their natural colors.

Such is a very rapid survey of the advances of our art since we last met, many really important steps of progress having received but a word of mention.

PHOTOGRAPHY, INSTANTANEOUS. The new gelatine process of instantaneous photography recently introduced has well-nigh revolutionized the art. The process of preparing the plates for it is very difficult. Yet the results of the experiments in taking instantaneous pictures have been highly satisfactory. The effects of light on the prepared plates are so rapid, that the hand is not quick enough for the manipulations, and quicker working devices had to be employed. In pictures of vessels going at full speed taken by this process, the thinnest ropes appear as distinct as when the boats are at rest, and each wave of the water is clearly pictured. Rogers, the sculptor, used the process with perfect success for taking pictures of athletics struggling. Horses trotting or galloping are taken with accuracy; also children playing and running about. Pictures of persons laughing are full of life and free from any stiffness. Recently several physicists have even taken instantaneous photographs of lightning which show every detail of the flash quite distinctly; also pictures of cannon balls and other projectiles in the act of moving through the air have been successfully taken by this process.

PHOTO-MECHANICAL PROCESSES are all processes in which, by the aid of light, in connection with chemical and mechanical treatment, printing surfaces are prepared which can be used for multiplying impressions without the further aid of light. Success in photo-mechanical processes depends upon the use of substances which are sensitive to light, and which are used to produce, photographically, the design either flat for etching or direct printing, or in relief for molding, for electrotyping, stereotyping, etc. Bitumen or asphaltum was first used by Nicéphore Niepce in 1827; chromatized gelatine, albumen and gum arabic were used by Talbot in 1832 for etched plates; and chromatized gelatine was first employed for transfers and for electrotyping and stereotyping by Paul Pritsch in 1854.

Prof. Chas. F. Chandler, of Columbia College, New York, classifies photo-mechanical processes as follows:

I. Those in which the picture is moulded in gelatine colored by a pigment woodburytype or photolith.

II. Those in which the picture is printed in printing ink.

A. Collotype processes (Lichtdruck, Phototype), in which the picture is printed from a gelatine surface.

1. Albortype; 2. Artotype; 3. Indotint or Autoglyph; 4. Heliotype; 5. Leimtype.

B. Processes in which the picture is printed from stone.

1. Photolithograph; 2. Photo-caustic; 3. Ink Photo.

C. Processes in which the picture is printed from a metallic relief surface: "typographic or block printing."

a. Swelled gelatine processes.

1. Photo-electrotype (copper); 2. Photo-engraving (type-metal).

b. Photo-etchings.

1. Photo-zincograph (by transfer); 2. Zincotype (direct photo on plate with albumen or bitumen); 3. Typogravure (copper); 4. Chromotypogravure (several plates).

D. Processes in which the picture is printed from an intaglio copper plate.

1. Photo-gravure; 2. Photo-aquatint; 3. Goupil-gravure.

WOODBURYTYPES.—The Woodburytype or Photoglyph was invented by W. B. Woodbury. A sheet of bichromatized gelatine is exposed under a negative; it is then washed to remove the unchanged gelatine that was protected from the negative, and finally dried. This relief film is then placed upon a sheet of lead and forced into it by hydraulic pressure, thus producing an intaglio mould.

This mould is placed in a horizontal press and flowed with a solution of warm gelatine colored with pigment. A sheet of paper is then laid upon it, and the excess of colored gelatine is forced out by pressure. The paper print is hardened in a solution of alum. The result is a gelatine pigment picture. A sheet of glass is sometimes substituted for the paper, and transparencies and lantern slides of great beauty are obtained.

The **STANNOTYPE** is a modification in which tin foil, properly backed by electrotyping or otherwise, is substituted for the lead plates.

The **PHOTO-FILIGRANE** or **PHOTO-DIAPHANIC** process consists in attaching the gelatine relief to a plate of steel and using it to produce, by pressure, transparencies in white paper, which resemble water-marks.

ALBERTYPES.—Joseph Albert, of Munich, in 1869, devised this most successful process for re-producing photographs in printer's ink.

A sheet of plate glass is coated with a thin film of chromatized albumen and gelatine, laid face down on black velvet and exposed to light. It is then washed and dried. The insoluble film adheres firmly to the glass and serves as a foundation for the second film, which consists of chromatized gelatine. This is exposed under a negative which has been reversed by stripping. The plate is then soaked in water to remove the soluble bichromate, the film is hardened with chrome alum and then dried. The result is an almost invisible picture in gelatine, which has become insoluble in water, and actually repellent for water; while the gelatine which was protected by the negative (the whites) retains its absorbing power.

The plate is fastened by plaster-of-paris to the bed of the press, and the printing is then conducted very much as in ordinary lithography. A wet sponge is applied to moisten the whites, and an ink roller to ink the picture. A sheet of paper is placed on the surface, and on applying pressure

the ink is transferred to the paper. The picture may also be printed on linen, silk, etc.

ARTOTYPES.—Obernetter, of Munich, invented this improvement on the Albertype in 1878. He uses a mixture of albumen and soluble glass for the foundation film, on which the sensitive film is afterward placed. As this film does not require to be hardened by light, opaque metallic plates may be substituted for the plate glass of the Albertype; otherwise the process is substantially identical with that of Albert.

INDOTINTS.—In this process, invented by T. C. Rocher, of New York, the plate, usually of copper, is roughened or pitted by exposure to the sand-blast, in order to cause the sensitive film to adhere tenaciously. Extra toughness and tenacity are also produced in the film by the addition of alcohol to the chromatized gelatine. After exposure under the negative, the unchanged bichromate is washed out and the plate is dried. These plates can be used in the power press, and 1,000 copies an hour may be printed from them.

HELIO TYPES.—Between the years 1869 and 1872, Ernest Edwards, formerly of London, now of New York, made a number of improvements in collotype printing which resulted in the Helio type. The most important features of the improvements are the hardening of the gelatine film by chrome alum, and the detaching of it from the support upon which it is first prepared. When completed it is a thin sheet or "skin" of gelatine, tough and flexible. For printing it may be placed on a plate of zinc, or it may be attached to a cylinder. It may be preserved and used for printing, as occasion may demand.

COLLOTYPE IN COLORS.—Albert, Bierstadt, Frisch and others have succeeded in producing very beautiful pictures in colors, by preparing several gelatine plates, each plate bearing particular parts of the picture, and being used for printing the appropriate colored ink. As many as seven different plates are employed successively in producing the picture.

There are different methods in use for preparing the several plates.

One plan is to make a separate negative for each color. This is accomplished by interposing a suitable screen of colored glass, or colored liquid, between the object and the photographic plate in the camera. For example, a screen which shuts out all colors except blue will permit only the blue portions of the picture to be photographed on the negative, and a gelatine plate from this negative may be used for printing with blue ink. In a similar way another screen will furnish a negative and plate for the red portions of the picture and so on.

Another plan is to prepare the gelatine plates from one and the same negative by "stopping out" all of the picture except that of one color.

LEIM TYPES.—In 1887, Husnik, of Prague, invented a process for preparing high relief plates of gelatine that can be used for typographic printing in an ordinary printing press, either for the reproduction of pictures or letterpress. Husnik uses a thick plate of chromatized gelatine and exposes it under a negative as usual. He then attaches this by means of gutta percha to zinc or wood, thus making a firm, but somewhat elastic foundation for the printing surface. He then develops the surface by treatment with a solvent, such as a saturated solution of an alkaline bichromate. This not only dissolves the gelatine upon which the light did not fall, but it also deepens and strengthens the relief. The development is stopped before any of the finest lines or dots are injured. The plate is

dried and the lights are covered with a solution of opaque printer's ink, by means of a camel's hair brush. The plate is then exposed for a second time to the action of light, by which it is hardened and strengthened, not only on the surface, but also on the flanks of each line and dot. The black is then removed and the solvent is again applied to deepen the whites. These plates may be used directly in the press, and will print 100,000 copies. By making wax moulds from these plates they may be reproduced in copper by electrotyping.

PHOTO-LITHOGRAPHS.—Various plans were suggested for securing on lithographic stone a photographic impression which could afterward be used for printing the fatty inks. The process of J. W. Osborne, formerly of Melbourne, now of Washington, was made public in 1861, and proved to be a great improvement. It is what is called a "transfer process." A sheet of paper is coated with a solution of albumen, gelatine and bichromate of potash. It is then dried in the dark, and subsequently placed, face down, on a sheet of smooth copper, and passed through a lithographic press in order to glaze and flatten it. It is then exposed under a negative, and afterward coated uniformly with greasy lithographic transfer ink. In order to coagulate the albumen in the film, the paper is now floated, inked side upward, on boiling water. At the same time the unaltered gelatine, which was protected by the opaque portions of the negative, absorbs moisture and swells, leaving the unaltered gelatine, the lines of the picture, depressed. The print is now placed, face upward, on a smooth board and washed off gently with a sponge dipped in water. It is then pinned to the board and the washing is completed with a stream of boiling water. The print is then dried, and the picture is transferred to stone by simply placing it upon the stone, face downward, and passing it through the press. The stone is now ready for lithographic printing in the steam press at the rate of 1,000 copies an hour. One hour is sufficient for taking the negative, preparing the transfer and placing it upon the stone.

The picture may, if desired, be transferred to a zinc plate instead of stone.

PHOTO-CAUSTICS.—This name is given to photo-lithographs produced in half-tone by means of a Meisenbach ruled negative.

INK PHOTOS.—This name is given by Sprague, of London, to photo-lithographs in half-tone, prepared by a process which is kept secret. The pictures do not show the decided dotted character of the Meisenbach negative, but are very fine grained and soft.

PHOTO-ELECTROTYPES.—Many processes have been proposed for producing electrotypes from gelatine relief surfaces. Among the most successful are those of Paul Fritsch, of Vienna, 1857; Alphonse L. Poitevin, of Paris, 1862; Paul Emil Placet, of Paris, 1864; W. A. Leggo and G. E. Desearats, of Quebec, 1865; W. H. Mumler, of Boston, 1875. All of these consist substantially in exposing a sheet of chromatized gelatine, under a negative, to the action of light. The effect is to render the parts reached by the light insoluble and non-absorbent for water. While the parts protected by the negative remain soluble in warm water and other solvents, and retain the property of absorbing cold water and swelling. After the exposure under the negative, the gelatine is either simply soaked in water to swell the whites, or it is treated with warm water, acetic acid or some other solvent to wash them away. In either case by making moulds of wax or plaster, it is easy to electrotype a copper relief block for typographic printing. By the use of

Meisenbach, or other grained negatives, half-tone effects are obtained.

PHOTO-ENGRAVINGS.—In this neighborhood this term has been applied to type metal relief blocks for typographic printing. These blocks have been made from gelatine reliefs prepared as described under **ELECTROTYPES**; plaster moulds being used for casting the type metal.

The Moss process belongs to this class. It is said that the peculiarity consists in first taking a mould from the gelatine relief with a mixture of asphaltum, rosin, sulphur and india rubber, and with this mould making a second mould in plaster-of-paris for the casting of the type metal.

PHOTO-ZINCOPHGRAPHS.—This name is sometimes given to pictures printed from zinc plates to which the design has been transferred in adhesive transfer ink, from paper, in the manner described under **PHOTO-LITHOGRAPHS**. The plate is then treated with acid to sink the whites, thus producing a lone relief.

ZINCOTYPES.—High relief plates for typographic printing. The zinc is coated with bitumen or with bichromatized albumen. It is then exposed under a negative and subsequently developed. The bitumen picture is developed with oil of turpentine. The bichromatized albumen is first coated with printer's ink, then developed by gently rubbing in cold water with a tuft of cotton. By suitable etching agents the whites are dissolved away, leaving the picture in high relief.

The Ives process, invented by F. E. Ives, of Philadelphia, in 1881, is a most ingenious process for producing half-tone negatives for making relief blocks. The picture is converted into a series of dots of varying sizes. The Meisenbach negative has been already referred to. It was devised by G. Meisenbach, of Munich, in 1882, and is available for many different photo-mechanical processes. William Kurtz, of New York, has a process of similar character, which gives very fine results.

TYPO-GRAVURES.—This is the name given by Bousso, Valadon & Co., successors to Goupil & Co., of Paris, to half-tone pictures printed from copper relief plates, which are apparently etched, either by means of bitumen, chromatized albumen, or some other similar sensitive coating. The surface of the metal is grained substantially in the same manner as plates prepared under Meisenbach negatives. These plates are much used in Paris by the illustrated papers.

CHROMO-TYPOGRAVURES are produced by the same process as **Typo-gravures**, except that several plates are used with different colored inks. "Figaro Illustre" is embellished with pictures of this kind. They are made by Bousso, Valadon & Co.

PHOTO-GRAVURES.—Numerous processes have been invented for producing copper intaglio plates by the aid of photography, beginning with the process of Niepce, 1827. In some of these processes the picture was etched into the copper; in others a mould was prepared and the plate was electrotyped into existence. Many firms in Europe and this country now prepare these plates, and the results are very fine. The processes, however, are rarely given to the public.

The process of Mr. Woodbury, 1870-72, which was worked with the greatest success by Goupil & Co., of Paris, consisted in preparing just such a gelatine relief film as was made in the Woodburytype process already described. There was one modification, which consisted in adding a gritty powder, like pulverized glass, to the gelatine, to produce a grain in the relief film. This relief is used to make a mould which is used for electrotyping the final copper plate. Another process consists in coating

the metal with chromatized gelatine, exposing under a transparent positive, and etching through the gelatine with perchloride of iron.

PHOTO-AQUATINTS are pictures also printed from intaglio copper plates. The process is said to be simpler than the photo-gravure. It is adapted for reproducing portraits direct from life.

GOUPIL-GRAVURES are fac-similes of water color paintings. They are printed in colors from photo-gravure plates. The plate is inked by hand in different colored printing inks, and the picture is printed by one impression. The plate is then cleaned and again inked in colors for another impression, and so on.

PHYLLOXERA (*Phylloxera vastatrix*). See Britannica, Vol. XXIV, p. 239, and the article **INSECTS INJURIOUS TO VEGETATION**, in these Revisions and Additions.

PHYSICAL EDUCATION. An admirable law of nature provides that—within certain limits—parts of the human frame increase in strength, aptitude and size in proportion to the use made by them. In gymnastics this law is brought to bear successively on every part, and finally on the whole system in combined action. If the exertion be not carried so far as to induce excessive fatigue, all other parts of the body sympathize with the improving condition of that which is mainly exerted; the circulation, excited from time to time by the exercise, acquires fresh vigor, and, blood being driven with unwonted force into all parts of the system, every function is carried on with increased activity. An improvement in the general health soon becomes manifest, and the mind—if simultaneously cultivated with judgment—increases in power and endurance.

The special value of gymnastics lies in their exercising the arms, shoulders, and chest. On this account they are particularly valuable for all who lead sedentary lives, and also as an important auxiliary for those who wish by athletic exercises to perfect their muscular development.

In Greece, the cultivation of the body by means of gymnastics began in the earliest life of the boy, and was fostered and encouraged by valuable rewards in both fame and riches accruing from success at the Olympic games. Aristotle considered a commonwealth essentially defective, if gymnastics were not a part of its code. Plato called him a cripple who, cultivating his mind alone, suffered his body to "languish through sloth and inactivity." In Germany, Switzerland, Sweden and France gymnastic exercises are made compulsory in most of the educational institutions as well as in the armies.

In this country gymnastics was until lately regarded as a pastime for boys, or a prescribed remedy for some of the ailments of the other members of society. Of late some of the educational institutions pay official attention to gymnastics, athletics, or physical education. Among these are prominent Harvard University and the University of Pennsylvania. Some of the other American colleges have also introduced gymnastics recently, but this branch of their educational work plays only a subordinate rôle. It should be better understood that gymnastics does not only increase the muscular strength and vitality of the body, but also the activity and vigor of the brain, and that it enables students to do more and better work in every branch of study.

PHYSICK, PHILIP SYNG, an American physician and surgeon, born in Philadelphia, Pa., in 1768, died there in 1837. He was a member of the French Institute and of the Royal Medical and Chirurgical Society of London. He held many important positions in Philadelphia.

PHYTOLACCA, a genus of exogenous plants, of the natural order *Phytolaccaceæ*. This order contains about seventy known species, half-shrubby and herbaceous plants, natives of warm parts of Asia, Africa, and America. The genus *Phytolacca* has for its fruit a berry with 8-10 cells, each cell one-seeded. *P. decandra*, the Poke or Pocom, a native of North America, now naturalized in some parts of the south of Europe, is sometimes cultivated for its young shoots, which, when blanched, are eaten like asparagus.

PIANA DE' GRECI, a town of Sicily, in the province of Palermo, ten miles southwest from Palermo. It was the chief colony of the Albanians who settled in Sicily in the 15th century, taking refuge from Turkish tyranny. The colony at Piana de' Greci was founded in 1488. The descendants of the colonists still follow the Greek ritual, and adhere to all the customs of the Eastern church, although acknowledging the supremacy of the pope. The Albanian dress is partially retained among the poorer classes, and particularly among the women. The inhabitants of Piana de' Greci are mostly husbandmen and shepherds. The houses are generally mean buildings of a single story. Population, about 7,500.

PIANO, or **PIANOFORTE**, a well-known stringed instrument played with the fingers by means of a key-board. The business of manufacturing pianos is continually assuming larger proportions in the United States, and many useful improvements are made in their construction. The inventive genius of America has, during the last forty years, accomplished more in perfecting and cheapening these instruments than that of all the other nations put together. The best American pianos are acknowledged to be superior in many of their details to the best ones produced in England and on the continent of Europe. For general article see *Britannica*, Vol. XIX, pp. 64-78.

PIASSABA, or **PIACABA**, a remarkable vegetable fiber which has become an article of much importance. It is procured from Brazil, chiefly from the ports of Para and Maranhão, and is produced by one or more species of palm. That which furnishes the greater part is the coquilla-nut palm (*Attalea funifera*); but Mr. Wallace states that much of it is procured from a species of *Leopoldinia*, which he has named *L. piassaba*. This material has been found of great utility in making brushes of a coarse kind, particularly those required to sweep the street.

PIASTRE, a Spanish silver coin which has been extensively adopted by other nations. It was formerly divided into eight silver reals, and hence was termed a *piece of eight*. The present Spanish piastre, commonly known as the *peso duro*, *peso fuerte*, or, briefly *duro*, is the standard of the money system, and is equivalent to about a dollar of our money.

PIATT, JOHN JAMES, an American poet, born in Indiana in 1835. Many of his books of poetry have been produced in conjunction with his wife, Sarah M. Bryan Piatt, and with W. D. Howells.

PIBROCH, a species of martial music performed on the bagpipe of the Highlanders, which has been found to have a wonderful power in arousing their military instincts. Its rhythm is so irregular, and its notes in the quicker parts so much jumbled together, that a stranger has difficulty in following the modulations or reconciling his ear to them. The earliest mention of the military music of the bagpipe is in 1594, at the battle of Balrinnies. According to Sir Walter Scott, the connoisseurs in pipe-music affect to discover in a well-composed pibroch the imitative sounds of march, conflict,

flight, pursuit, and all the current of a heady fight. Many remarkable instances have been recorded of the effect of the pibroch on the Highlanders.

PICKEN, ANDREW, a Scotch novelist, born at Paisley in 1788, died in 1833. He traveled much in early life; followed various avocations in Scotland, Ireland and England; and became a professional writer in London in 1827.

PICKENS, ANDREW, an American Revolutionary general, born in Pennsylvania in 1739, died in 1817. He is known as the hero of the battle of Cowpens and Kettle Creek. After the war he was for many years a legislator.

PICKERING, TIMOTHY, an American Revolutionary statesman, born at Salem, Mass., in 1745, died in 1829. He was Washington's adjutant-general and, later, quartermaster-general; and after the war he held high federal offices. His son, JOHN PICKERING (1777-1846), was a distinguished philologist. Another son, OCTAVIUS PICKERING (1791-1868), was an eminent lawyer. CHARLES PICKERING (1805-1878), grandson of Timothy, was a physician. EDWARD CHARLES PICKERING, great-grandson of Timothy, born in 1846, is an eminent astronomer.

PICKERSGILL, FREDERICK RICHARD, an English painter, born in 1820. He studied at the Royal Academy of which he was elected a member in 1857. His *Combat between Hercules and Archelus* and *The Death of King Lear* made him famous. His magnificent *Burial of Harold* was bought for the houses of parliament.

PICKETT, ALBERT J. (1810-1858), assistant adjutant-general in the Creek war, and author of a valuable *History of Alabama*.

PICKETT, GEORGE E., an American soldier, born in Virginia in 1825, died in 1875. He graduated at West Point, served with distinction in the Mexican war, and as major-general in the Confederate army.

PICTON, a town, the county-seat of Picton county, N. S., and a port of entry on Northumberland Strait. It has a good harbor and is an important railroad terminus, and a mining, manufacturing and educational center.

PIEDMONT, a village of West Virginia, on the north branch of the Potomac, 170 miles east of Wheeling. It has a good trade connected with the coal-mining industry, and is an important shipping-point.

PIEDRA BLANCA, a town of the Argentine Republic, South America, in the province of Catamarca, twenty-miles southwest from Catamarca. Population about 10,000.

PIERCE, GEORGE FOSTER, an American divine, bishop of the Methodist Episcopal Church, South, born in Georgia in 1811, died in 1844.

PIERCE, GILBERT ASHVILLE, an American statesman. He was born in East Otto, Cattaraugus county, N. Y. He emigrated to Indiana in 1854; attended Chicago University and studied two years in the law department of said institution; enlisted in Company H, 9th Indiana volunteers, at the first call of the President, and was elected 2nd Lieutenant of said company. At the expiration of the three-months' service was appointed a captain and assistant Quartermaster by President Lincoln; was at Paducah, Fort Donelson, Shiloh, Grand Gulf, Vicksburg, and entered the city at the capture, on July 4, 1863; was promoted to lieutenant-colonel in November, 1863 and served at Matagorda Island, in Texas in 1864; was appointed a colonel and inspector, and special commissioner of the War Department; was at Hilton Head and Pocotaligo, South Carolina, and thence was ordered to the Department of the Gulf, where he served till October.

1865; was a member of the Indiana legislature in 1868; was assistant financial clerk of the United States Senate from 1869 to 1871; resigned to accept an editorial position on the "Chicago Inter-Ocean"; served as associate editor and managing editor of that paper for twelve years; in 1883 became connected with the "Chicago News"; in July 1884, was appointed governor of Dakota, which position he resigned in November, 1886; at the meeting of the legislature of the State of North Dakota in November, 1889, was elected United States Senator.

PIERCE, RICE A., born in Weakley county, Tenn., July 3, 1848; was for two years a member of the eighth Tennessee cavalry, Confederate States army; was wounded and captured in a cavalry fight near Jackson, Tennessee, in 1864; was a prisoner of war till close of war; attended the common schools of the country, and was two and one-half years at the London High School, London, Ontario; read law at Halifax, North Carolina, in the office of Judge Edward Conigland; was licensed to practice law by the supreme court of North Carolina, in July, 1868; was elected district attorney of the twelfth judicial circuit in 1874; reelected in 1878 for the full term of eight years; was elected to the 48th Congress and again to the 51st Congress.

PIERCE CITY, a village of Missouri, about fifty miles west of Springfield. It is the trade center of a rich farming district.

PIERMONT, a village of New York, on the west bank of the Hudson, four miles south of Nyack, just north of the Palisades. It contains many handsome residences and several manufactories.

PIERPONT, JOHN, an American poet, born in Connecticut in 1785, died in 1866. He was successively a teacher, a lawyer, a merchant, a Unitarian minister, an army chaplain and an employé in the Treasury Department. He wrote many fine poems, and was an eloquent anti-slavery and temperance orator.

PIERCE, a city, the capital of South Dakota and the county-seat of Hughes county, on the east bank of the Missouri, opposite Fort Pierre. It is the seat of Pierre University and has a very active river and railroad trade.

PIERREPONT, a village of New York, near the Racket River, about ten miles south of Potsdam. It has manufactories of cheese-boxes and butter-tubs.

PIERREPONT, EDWARDS, a distinguished American jurist, born in Connecticut in 1817. He conducted the case of the Government against Surratt for complicity in the murder of President Lincoln; was Attorney-General of the United States, and was appointed minister to England in 1876. His decisions and writings upon international law have materially influenced the policy of European governments.

PIETRAPERZIA, a town of Sicily, in the province of Caltanissetta, six miles southeast from Caltanissetta, on a lofty height rising from the left bank of the Salso. There are sulphur mines in the vicinity. Population, about 10,500.

PIETA, the name given in the language of art to representations of the Virgin Mary, embracing the dead body of her son. It is a counterpart to the *Madonna* with the infant Jesus in her arms. The one affords an opportunity for the representation of the purest joy and highest motherly love; the other, of the utmost pain and grief. The *pietà* has long been a favorite subject, not only with painters, but with sculptors. A famous one by Michael Angelo is in the Church of St. Peter at Rome.

PIG. See SWINE in these Revisions and Additions.

PIGEON. See BRITANNICA, Vol. XIX, pp. 84 and 85.

PIGMENTS. See BRITANNICA, Vol. XIX, pp. 85-88, and the separate articles as BARYTA, LITHARGO, RED AND WHITE LEAD, SIENNA, VERMILION, etc.

PIKE, freshwater fishes. See BRITANNICA, Vol. XIX, pp. 88 and 89.

PIKE, a foot soldier's weapon, consisting of a long wooden shaft with a pointed steel head. Previously to the use of the bayonet, infantry of the line of battle—that is, the heavy-armed troops—were from the earliest times armed with spikes or spears. As a defence against cavalry, the pike, from its length and rigidity, was of great value; but though it long survived the introduction of gunpowder, it is now superseded by the bayonet.

PIKE, ALBERT, an American lawyer and poet, born in Massachusetts in 1809, died in 1891. He became a journalist in Arkansas; was brigadier-general in the Confederate army; and wrote numerous ritualistic and other standard works on Freemasonry.

PIKE, ZEBULON MONTGOMERY (1779-1813), an American soldier and explorer, born in New Jersey in 1779. In the service of the Government he explored the head waters of the Mississippi and the interior of the Louisiana Territory; discovered Pike's Peak; reached the Rio Grande, and was for some time held prisoner by the Spanish authorities. He served in the war of 1812-14; commanded the expedition against Toronto, before which place he was killed by the explosion of the magazine, April 27, 1813.

PIKE'S PEAK RAILWAY, a railway up Pike's Peak, Colorado. It is a rack-rail line on an improved principle, the line being nine miles long, with about four and a half miles of curves. The maximum gradient is about twenty-five per cent., and the sharpest curve sixteen degrees—385 feet radius. The summit is 14,200 feet above sea-level, and the trains are run at about five miles an hour. The chief difficulty in its construction was with the laborers, who had to become acclimatized to work at an altitude of 14,000 feet.

PILLIBHIT, or PHILLIBIT, a town of India in the British district of Bareilly, northwest provinces, twenty-eight miles northeast of Bareilly, on the left bank of the Gurrak. It is a place of considerable trade and its rice, celebrated throughout India for its excellence, is the produce of the south of Kumaon. Population, 26,760.

PILLOW, GIDEON JOHNSON, an American soldier, born in Tennessee in 1806, died in 1878. He served in the Mexican war, and was a distinguished major-general in the Confederate army.

PILOT KNOB, a village of Missouri, at the foot of Pilot Knob Mountain, a mountain of iron ore. The village contains smelting furnaces, and has a good trade connected with the iron industry.

PILOTY, KARL VON, a German painter born at Munich in 1726, died there in 1886. In 1858 he became professor at the Munich Academy, and in 1874, when Kaulbach died, Piloty was made director of the academy. His most noted works are *The Assassination of Wallenstein*; *Nero amid the Ruins of Rome*; *Columbus Discovering America*; *The Death of Julius Cæsar*; *Mary, Queen of Scots, Listening to Her Death Warrant*, and *Tusnelda in the Triumph of Germanicus*. He obtained the highest honors at several international exhibitions. Piloty was one of the foremost historical painters.

PINCKNEY, a family of American statesmen, represented during the Revolutionary period by CHARLES COTESWORTH (1746-1825), and THOMAS (1750-1828), both born in South Carolina. They served with distinction throughout the war; and both held highly important positions of trust under the Federal government. CHARLES (1768-1824), their

second cousin, was four times governor of South Carolina. His son, HENRY LAURENS (1794-1763), was a statesman and biographer, and the founder of the Charleston "Mercury."

PINDAR, JOHN S., born in Sharon, Schoharie county, N. Y., Nov. 18, 1835. He was educated in the common schools and Richmondville Seminary; studied law, and was admitted to the bar in 1865; was elected President of the village of Cobleskill in 1882, was chairman of the Democratic county committee for many years; was elected to the 49th Congress, and at its close resumed the practice of law and was again in Congress from 1889 to 1891.

PINE, a forest tree. See Britannica, Vol. XIX, pp. 102-106. The pine (*Pinus*) is well represented in the United States. The white pine (*P. strobus*) yields most of the lumber used here. It grows straight and rapidly, sometimes attaining a height of 200 feet. Its large and straight trunks are sought as masts of ships. A species of the white pine is the sugar or Lambert's pine of California and Oregon, one of the huge trees of the West. It is sometimes 300 feet high and twenty feet thick. The pines of the Southern Atlantic States are of special value in their abundant yield of rosin, and

oil of turpentine, tar and pitch. This is mainly gathered from the "Georgia Pitch Pine" (*P. australis*), the yellow pine of the Southern States. The loblolly pine (*P. taeda*) yields also a considerable quantity of turpentine. These resinous pines furnish hard lumber for floors and stairs. They range from North Carolina to Florida, and yield about ten million dollars worth of naval stores (pitch, tar, etc.) per annum. The crude turpentine is obtained by tapping the trees, and collecting the exuda-



LAMBERT'S PINE (*P. Lambertiana*).

tions. Ten to fifteen per cent. of these is turpentine. This is obtained by distillation. The residuum constitutes the rosin of commerce.

PINEAPPLE. See Britannica, Vol. XIX, p. 106. The pineapple is the fruit of *Ananassa sativa*, a tropical plant, similar to the aloe, but with leaves having small sharp spines on its edges. From the center of a cluster of leaves rises a stem two feet high. This stem bears on its apex a conical spike of flowers, each flower in the axil of a bract. The upper flowerless bracts develop and consolidate into a fleshy mass which is succulent and sweet when ripe. On the outer tessellated surface the tips of the bracts and the rudiments of the petals show themselves. Botanically considered the pineapple is no fruit, but an inflorescence, whose accessory parts are greatly enlarged. Most of the pineapples sold in the United States come from the Bahama Islands, where they are extensively grown. Some are also brought from Jamaica and Trinidad.

PINE BLUFF, a city, the county-seat of Jefferson county, Ark., on the Arkansas River, about fifty miles south of Little Rock. It is an important

manufacturing and educational center, and has an extensive trade in cotton and other products. Population in 1890, 9,952.

PINKNEY, WILLIAM, an American statesman, born in Maryland in 1764, died in 1822. He became an eminent lawyer; was United States Attorney-General; Senator; and Minister to England, to Naples, and to Russia.

PINS. For a general article on PINS AND PINMAKING see Britannica, Vol. XIX, pp. 97 and 98.

PIOMBINO, a principality now incorporated in the kingdom of Italy. It lies along the Italian coast opposite the Island of Elba, the greater part of which belonged to it. Its extent was about 132 English square miles. Piombino is now a part of the province of Grosseto, in the kingdom of Italy. The strait between Piombino and Elba is called the "Channel of Piombino."

PIP, CHIP, or ROMP, a disease of poultry, often fatal. When it appears in a poultry-yard, it often attacks many fowls in rapid succession, so that it is regarded as highly contagious. It begins with a slight hoarseness and catching in the breath, which is followed by an offensive discharge from the nostrils and eyes, rattling in the throat, and an accumulation of mucus in the mouth, forming a "scale" on the tongue. The communication of the disease from one bird to another is supposed to take place through the contamination of the water in their common drinking vessel. Castor oil is freely administered by some poultry-keepers.

PIQUA, a city of Ohio, an important trade and manufacturing center. Population in 1890, 9,090. See Britannica, Vol. XIX, p. 114.

PIQUE WORK, a very fine kind of inlaying with gold, silver and other costly materials; in fact, a kind of Buhl-work, carried out on a very minute scale. It is only applied to articles of small size, such as snuff-boxes, card-cases, and similar articles.

PIRANO, a seaport of Austria, on a peninsula in the Bay of Largon, fifteen miles southwest of Trieste. It contains an old castle, has a port and several dock-yards, and is the seat of considerable trade and commerce. Among its more important edifices are an interesting Gothic church, a town-house, and a Minorite convent, with a number of good pictures. Wine and oil are made in considerable quantities, and there are salt-works in the neighborhood, which produce upwards of 330,000 cwt. of salt annually. Population, 9,200.

PISCATAQUA, a river about eighty miles in length, which forms the southern part of the boundary between Maine and New Hampshire, and empties itself into the Atlantic, forming at its mouth the excellent harbor of Portsmouth.

PISCICULTURE. See Britannica, Vol. XIX, pp. 116-129.

PISTOL, a fire-arm similar to a rifle but intended to be held in one hand when aimed and fired. Pistols vary in size, from the delicate saloon-pistol, often not 6 inches long, to the horse-pistol, which may measure 18 inches and sometimes even 2 feet. They are carried in holsters at the saddle-bow, in the belt, and in the pocket. Every cavalry soldier should have a pistol, for a fire-arm is often of great service for personal defense, and almost indispensable in giving an alarm or signal. Sailors, when boarding an enemy's ship, carry two each in their waist belts.

PIS-TOLE, *n.* (Fr.). A gold coin of Spain, worth about 16 shillings sterling or \$3.60. In other countries it varies from \$3 to \$5.

PITCHURIM BEANS, or SASSAFRAS NUTS, an occasional article of importation from South America. They are the seed-lobes of *Nectandra puchury*,

growing on the banks of the Rio Negro and elsewhere in the rich alluvial parts of the basin of the Amazon. They are about an inch and a half long, and half an inch broad, and are much in request among chocolate manufacturers for flavoring chocolate, as a substitute for vanilla.

PITKIN, an important mining village of Colorado, about thirty miles northeast of Gunnison.

PITMAN, BENN, an American photographer and educationist, brother of Isaac, born in Trowbridge, England, in 1822. He came to the United States and settled at Cincinnati. He was official reporter of many important State trials. In 1873 he became a professor in the school of design of the University of Cincinnati.

PITMAN, ISAAC, the inventor of the Pitman system of shorthand writing, born at Trowbridge in 1813. He was educated at a college of the British and Foreign School Society, becoming afterwards master of the British school at Barton-on-Humber. He removed to Bath in 1839, where he subsequently established the Phonetic Institute, and set up a press for printing his own handbooks of phonetic shorthand, and a series of classical works in phonetic type. Mr. Pitman is editor of the "Phonetic Journal," which is devoted to the advocacy of writing and spelling reform. See **SHORTHAND**, in **ENCYCLOPEDIA BRITANNICA**.

PITRA, JEAN BAPTISTE (1812-1889), a French cardinal and monk. He wrote a work on canon laws, and became a cardinal in 1863.

PITTSBURG, a city, the county-seat of Allegheny county, Pa. Population in 1890, 233,473. See **BRITANNICA**, Vol. XIX, p. 150.

PITTSBURG LANDING, in Tennessee, the scene of the battle of Shiloh. See **BRITANNICA**, Vol. XXIII, p. 776.

PITTSFIELD, a village, the county-seat of Pike county, Ill., about forty miles southeast of Quincy. It has a good trade, and contains several flour and tobacco manufactories.

PITTSFIELD, a city, the county-seat of Berkshire county, Mass. Population in 1890, 17,281. See **BRITANNICA**, Vol. XIX, p. 151.

PITTSFIELD, a village of New Hampshire, about fifteen miles east of Concord. It is the seat of an academy, and contains a number of factories.

PITSTON, a city of Pennsylvania. Population in 1890, 10,295. See **BRITANNICA**, Vol. XIX, p. 151.

PIZZO, a seaport of South Italy, in the province of Catanzaro, twenty-four miles southwest from Catanzaro, on the Gulf of Santa Eufemia. It was at Pizzo that Murat, the ex-king of Naples, was taken, tried and shot. He was buried in one of the common vaults of a church to the erection of which he had largely contributed. Population, about 6,500.

PLACERVILLE, a city, the county-seat of El Dorado county, Cal., about forty miles east of Sacramento. It is an important center of various industries, principally gold-mining and fruit growing.

PLAID, a woolen garment, in the form of a large scarf, made to wrap round the body, and used chiefly among the rural population of Scotland.

PLAINFIELD, a village of Connecticut, about fifteen miles north of Norwich. It is the seat of an academy and has manufactories of cotton goods. Population in 1890, 4,519.

PLAINFIELD, a city of New Jersey, an important educational center. Population in 1880, 11,250. See **BRITANNICA**, Vol. XIX, p. 168.

PLAINS, a coal-mining village of Pennsylvania, on the North Branch of the Susquehanna, five miles northeast of Wilkesbarre.

PLAINWELL, a village of Michigan, on the Kalamazoo River, ten miles north of Kalamazoo. It contains a number of flour, lumber, and paper manufactories.

PLAN, a word frequently applied to all kinds of architectural drawings, but which ought to be limited to those which represent the horizontal sections of the various floors of buildings. Plans show the disposition of the apartments and walls, with the situation of the fireplaces, cupboards, doors, etc.

PLANE, a tree of the genus *Platanus*, of the natural order *Platanaceæ*. It is known under the names of "buttonwood" and "sycamore." The buttonwood of the United States is the largest of the American deciduous trees. Specimens 40 feet in circumference and 100 feet high have been found near our rivers. It grows from the Atlantic to the States west of the Mississippi, and as far north as Montreal, where it is called the "cotton tree." Its young shoots, leaves and stipules, are thickly covered with a fine down, which falls off as they expand, and floats in the air. When breathed in, it is apt to produce coughing. The female catkin is a globular ball one inch thick, borne on a flexible footstock 3 inches long. The wood of the plane is liable to warp if made into boards. It is mostly used for fire-wood.

PLANETA, the Greek name of the vestment called by the Latins *Casula*, and in English "Chasuble," which is worn by priests in the celebration of mass.

PLAN OF CAMPAIGN, a system of procedure propounded in 1886 in the columns of "United Ireland" by William O'Brien, M. P., and supported by the Land League. It was a recommendation to Irish tenants not to pay rent to landlords, but to pay officials representing the League what was deemed a fair rent, which would be handed over to the landlords, provided the latter accepted it as a payment in full. If refused, the money was to be used for the support of evicted tenants. The "Plan" was not long in being put in operation, and proved so embarrassing that the government proclaimed it as illegal. In spite of this, however, the "Plan" was long subsequently in operation in remote districts, and is so even now, though it gives much less trouble to the government.

PLAQUEMINE, a village of Louisiana, capital of Iberville parish, on the Mississippi, twenty miles south of Baton Rouge. It has an extensive river-trade. Population in 1890, 3,211.

PLASENCIA, an ancient and much-decayed, but picturesque town of Spain, forty-three miles north-northeast of Cáceres. It stands on a steep hill, with beautiful and fertile valleys, extending on the northwest and southeast sides. It is almost wholly girdled by the clear waters of the Jerte; and the surrounding scenery, embracing city, castle, river, rock, and mountains, and over-arched by a sunny and unclouded sky, is remarkably beautiful. The city contains the picturesque remains of an ancient castle, and is surrounded by crumbling walls, surmounted by 68 towers, and pierced by six gates. Water is brought to the town by an aqueduct of eighty arches. There are seven Gothic churches, an episcopal and several other palaces, and the cathedral, an ornate Gothic edifice, begun in 1493, some portions of which are still unfinished, while others have been altered and disfigured. The cathedral contains many noble tombs, with effigies. Plasencia, once a flourishing and important city, was founded in 1190. It now carries on some minor manufactures of cotton, woolen, and hempen fabrics, and of hats and leather. Population about 6,000.

PLATT, ORVILLE H., an American statesman, born at Washington, Conn., July 19, 1827. He received an academic education; studied law at Litchfield; was admitted to the bar in 1849, and has since practiced law at Meriden; was clerk of the State senate of Connecticut in 1855 and 1856; was secretary of State in 1857; was a member of the State senate in 1861 and 1862; was a member of the State house of representatives in 1864 and 1869, serving the last year as speaker; was United States Senator from 1879 to 1891, and was reelected for the term expiring 1897.

PLATTEVILLE, a village of Wisconsin, about twenty miles north of Dubuque, Iowa. It is the seat of a State normal school, and contains a large number of mills, factories, and lead-furnaces. Population in 1890, 2,790.

PLATTSBURG, a village, the county-seat of Clinton county, Mo., on Smith's Fork of Platte River, thirty miles east of St. Joseph. It is the seat of Clinton County Institute and of an academy, and has a good local trade.

PLATTSBURG, a village, the county-seat of Clinton county, N. Y. See *Britannica*, Vol. XIX, p. 213.

PLATTSMOUTH, a city, the county-seat of Cass county, Neb., on the Missouri River. Population in 1890, 8,392. See *Britannica*, Vol. XVII, p. 309.

PLAYFAIR, Sir Lyon, an English chemist, born in India in 1819. He has held many important governmental offices, and has written numerous scientific memoirs and valuable works on education.

PLEASANT GROVE, a village of Utah, near Utah Lake, about forty miles south of Salt Lake City. It is the trade-center of a rich farming and fruit-growing region.

PLEASANT HILL, a village, the county-seat of Cass county, Mo., about 60 miles west of Sedalia. It contains a college, several factories, and a number of flour-mills.

PLEASANT VALLEY, a coal-mining borough of Pennsylvania, eight miles Southwest of Scranton.

PLEASANTON, ALFRED, an American general, born in the District of Columbia, in 1824. He graduated at West Point; served in the Mexican and civil wars; became major-general; was collector of internal revenue; and was retired in 1888. His brother, General AUGUSTUS JAMES PLEASANTON, born in 1808, is known in connection with his investigations concerning the influence of the blue ray of the sunlight and of the blue color of the sky in developing animal and vegetable life and in arresting disease.

PLEASURE AND HEALTH RESORTS. For special mention of many PLEASURE AND HEALTH RESORTS see the articles relating to them severally in the *Britannica*, and in these Revisions and Additions.

EUROPEAN.—*Baden-Baden*, located in the valley of Oos, and built partly on the slope of a hill, with numerous pleasant gardens and wealthy villas, one of the most fashionable watering-places and summer resorts on the continent of Europe. The visitors during a single summer have sometimes numbered over 50,000. There are thirteen hot springs flowing out of the rocks beneath the *Schnecken-garten* or terrace of the castle. They vary in temperature from 117 to 157 degrees Fahr. These springs have been known for centuries, and the principal one is covered with a vault of Roman masonry. There are also vestiges of early Roman vapor baths and statuary. The *Promenade* and the *Conversationshaus* and the open park in front are special attractions. The summer residence of the

grand duke is here. Some of the edifices date as far back as about A.D. 1400. The parish church contains monuments of several of the margraves.

Brighton, the fashionable sea-side resort of the people of London, was only a fishing town about 200 years ago. Dr. Russell, a medical writer on the use of sea-water for bathing purposes, first suggested that it be made into a place of summer resort. George IV., when Prince of Wales, selected it in 1784 as the place for his marine summer-house. Its great pavilion is a curious piece of Moorish architecture. Its chain pier, (1,136 feet long) erected as a landing place in 1822, is composed of four chain bridges, each 255 feet in length, terminating in a granite-paved platform. The *Steyne*, its fashionable parade, was formerly a waste common. The *Chalybeate Spring* is highly esteemed for its medicinal virtues.

Carlsbad, a town of Bohemia, on the Löpel near its junction with the Eger, famous for its hot springs. It is in the bottom of a narrow valley between steep granite mountains. The springs contain the carbonate and sulphate of soda, with a temperature of 165 degrees Fahr. Every facility is furnished to health-seeking tourists, the number of whom have counted as many as 20,000 in a single year. The baths are most frequented from June to September.

Cannes, a French town on the Mediterranean, twenty-two miles by railway southeast from Nice; a great winter resort with more than fifty hotels specially fitted up for the convenience of tourists. It stands on a declivity facing the sea on the south, and is surrounded by olive and orange groves. Population about 14,000.

Emm, a noted watering place, pleasantly located on both banks of the Lahn, with a population of about 6,000. The two chief springs (under the old *Kursaal*) are the *Kesselbrunnen* and the *Kranchen*. The temperature of the former is 116 degrees Fahr. A covered suspension bridge connects these with the government gardens. The gambling rooms, which were formerly largely used, are now occupied for other purposes.

Schönbrunn, Austria, the imperial summer palace of Vienna, situated about a half-hour's railway ride from the city. The palace, fitted up by the Empress Maria Theresa in 1775, and occupied by Napoleon in 1805 and 1809, contains 1,500 chambers. Behind it extends the large park, open to the public. The grand parterre is adorned with thirty-two statues and fountains of much beauty. A zoological and a botanical garden are also connected with the park. Across the park are many wealthy villas and country houses and several public gardens. At Baden, near by, are several medicinal springs (alkaline and sulphur) and extensive baths, largely frequented from the middle of May to the middle of October.

Stockholm, one of the most beautiful capitals of Europe, partly built on nine islets, some of which are centers of special attraction to visitors, presenting beautiful streets and public gardens. The most picturesque of the islets is *Södermalm*, on the steep sides of which the houses rise in terraces to the summit, which is crowned with St. Catherine Church. Numerous summer palaces and country residences extend along the northeast shore of Lake Mælär, (whose waters are discharged by the channel inclosing the islet), and on the margins of the *Ladugaard's Holm*, whose central portions present a picturesque blending of rocks, wooded heights and romantic glens. Here also lies the famous *Djurgård*, or zoological gardens, and one of the finest public parks in Europe, occupying a peninsula, two miles long by about one mile wide.

St. Petersburg.—The summer gardens of this imperial city are the favorite promenade of the inhabitants. They are one mile long, by a half a mile wide, and are handsomely wooded and ornamented with statues.

Weisbaden, the capital of the Duchy of Nassau previous to 1866, now a part of Prussia; a beautiful town, celebrated for its baths, which attract a great concourse of visitors every year from June to September. There are 14 hot springs, the chief of which is the Kochbrunn (boiling spring), with a temperature of 156 degrees Fahr., situated at the end of a beautiful arcade called the Trinkhalle. The Romans called these springs *Fontes Mattiaci*. The Kursaal, a great building constructed and furnished for royal luxury, is the principal attraction. Formerly Wiesbaden was noted as a great gambling center, but since it passed under Prussian control gambling has been suppressed. Population about 21,000.

AMERICAN.—*NEW ENGLAND COAST.*—*Newport*, the most fashionable sea-side resort in America, on the beautiful island of Rhode Island, near the entrance of Narragansett Bay. There are three fine beaches, and the facilities for surf-bathing are unexcelled. The old stone mill in the park is an object of interest, and the island abounds in beautiful and romantic scenery.

Narragansett Pier is on the main-land opposite Newport. The beach is one of the best and safest on the Atlantic coast. Magnificent views are obtained from the heights. South and southwest are Block Island and Watch Hill Point.

Cape Cod, *Martha's Vineyard*, and *Nantucket* are in Massachusetts. Cape Cod is a narrow sand peninsula extending thirty-five miles east, then thirty miles north, northwest, and west. Martha's Vineyard and Nantucket are islands lying south of the Cape. To the north are Brant Rock, Marshfield, Scituate, Cohasset, and Nantasket.

Swampscott, the "Long Branch of Boston," one mile from Lynn and thirteen miles northeast of Boston. There are three good beaches and no undertow. Nahant, a bold promontory to the south, has a beach as hard as a floor. The Chelsea, or Revere Beach, nearer Boston, is a favorite resort of the masses. To the north are Salem, Marblehead, Beverly, Lowell Island, and the famous Singing Beach of Manchester. Farther north are Gloucester, Rockport, Pigeon Cove, Cape Ann, Newburyport, and Salisbury Beach.

The Isles of Shoals, eight bleak and barren little islands off the coast of New Hampshire, ten miles south-southeast of Portsmouth, are famed for the wild beauty of their scenery, and are a very popular resort. Rye Beach, the fashionable beach of New Hampshire, and Hampton Beach, are on the mainland south of Portsmouth.

Old Orchard Beach, the finest in New England, is on the coast of Maine, twelve miles southwest of Portland. Southwest are Wells Beach and York Beach, and northeast are Scarborough Beach, Cape Elizabeth, Cushing's Island, and Portland.

Mount Desert, an island off the coast of Maine, 110 miles east-northeast of Portland, is an assemblage of mountain peaks, one of which is 2,000 feet above the ocean. There are a number of charming lakes, the largest being several miles long. The area of the island is about 100 square miles.

LONG ISLAND COAST.—*Coney Island*, the most popular pleasure resort in the world, is on the sea-coast of Long Island, ten miles south of New York. The beach is hard, and gently sloping; it is five miles long, and has practically four divisions—Manhattan Beach, Brighton Beach, West Brighton, and Norton's, or West End.

Rockaway Beach, east of Coney Island, affords excellent surf-bathing on the south and still-water bathing in Jamaica Bay, on the north. Close by are also Rockaway village and Far Rockaway.

Long Beach, including Hempstead Bay, Babylon, and Islip, on Great South Bay, Fire Island Bay stretching far eastward, the quiet town of East Hampton, and many other resorts on the south shore, afford excellent surf-bathing, boating, and fishing.

Sea Cliff (on a picturesque bluff in Hempstead Harbor), Roslyn, Glen Cove, Sands Point, Great Neck, Bayside, Whitestone, College Point, and Flushing are on the north side, near New York. Eastward are Oyster Bay, Cold Spring, Northport, Setauket, Port Jefferson, Greenport, Orient Point, and Shelter Island.

NEW JERSEY COAST.—*Long Branch*, the "Summer Capital of America," situated on a broad plateau and bluff overlooking the Atlantic, thirty-one miles south of New York. The beach is one of the finest in the world, and the drives are excellent. In the vicinity are Seabright, Monmouth Beach, Atlanticville, Pleasure Bay, Oceanic, Red Bank, Monmouth Park, Race-course, Elberon, Deal Beach, and the village of Deal.

Cape May, the "Long Branch of Philadelphia," near the entrance of Delaware Bay. The fine surf and the long drive are especially noticeable. Neighboring resorts are Schellinger's Landing, Cold Spring, and Sea Grove.

Atlantic City, a popular summer and winter resort on Absecon Beach, between Cape May and Long Branch. The beach is noted for its safety. To the north are Brigantine Beach, Long Beach, and the hunting-grounds of Barnegat and Tuckerton.

Atlantic Highlands is on the Highlands of Navesink, in full view of Staten Island, Coney Island, Rockaway, and Sandy Hook. Here are also Navesink Park and Highlands.

Asbury Park is between Deal Beach and Wesley Lake, five miles south of Long Branch. It embraces about 500 acres beautifully laid out.

Ocean Grove, separated from Asbury Park by Wesley Lake, is six miles south of Long Branch. Farther south are Ocean Beach, Spring Lake, Sea Girt and Manasquan.

Island Heights is on an island in Barnegat Bay, between Ocean Grove and Atlantic City. Seaward, on the beach is Sea-Side Park.

Ocean City is six miles south of Atlantic City. It has a fine beach, seven miles long, with excellent facilities for bathing.

HUDSON RIVER AND EASTERN NEW YORK.—*Fort Lee* is a popular pleasure resort crowning the brow of the Palisades opposite New York. Above are Yonkers, Tarrytown, Sing Sing, Cruger's, Verplanck's, and Peekskill on the right, and Nyack, Rockland Lake, Haverstraw, Stony Point, and Caldwell's Landing on the left.

West Point, seat of the United States Military Academy, in the heart of the Hudson Highlands, fifty-two miles north of New York, is famous for its magnificent scenic attractions. In this region are Cranston's, Garrison's, and Iona Island, south, and Cold Spring and Cornwall Landing, north of West Point.

Cornwall Landing, the chief resort on the river, and the most romantic, lies at the foot of Storm King, four miles above West Point. Between this and Albany are Newburg, Marlborough, Rondout, and Catskill on the left, and Fishkill Landing, Poughkeepsie, Hyde Park, Rhinebeck, Trivoli, and Hudson on the right.

EASTERN AND SOUTHERN NOTABLE SPRINGS.—See

atoga, the great fashionable watering-place of America, thirty-eight miles north of Albany. There are twenty-eight acidulous, chalybeate, and other springs. The waters are cathartic and tonic, and are of world-wide celebrity. Six miles south are the famous springs of Ballston Spa.

Sharon, the "American Baden-Baden," is fifty-nine miles west by north of Albany. There are four springs, Chalybeate, Magnesia, White Sulphur, and Blue Sulphur. Ten miles northwest are the White Sulphur springs of Cherry Valley, and twenty miles southeast is Howe's Cave, after the Mammoth Cave of Kentucky the most remarkable cavern known.

The Virginia Springs Region embraces a considerable portion of the mountain land of Virginia and West Virginia. The springs are almost numberless, and of widely various medicinal character. The most noted are the Greenbrier White Sulphur, Old Sweet, Red Sweet, Salt Sulphur, Red Sulphur, Blue Sulphur, Warm, Hot, Healing, Bath Alum, Rockbridge Alum, Rockbridge, Rockbridge Bath, Jordan's Alum, Coyner's, Alleghany, Montgomery White Sulphur, Yellow Sulphur, Blue Ridge, Berkley, Capon, Rawley, Bedford, Alum, Grayson White Sulphur, Sharon Alum, Pulaski Alum, Eggleston's, Huguenot, Fauquier White Sulphur, Jordan's, Shannondale, Holston, and Orkney. In this region are also the famous Natural Bridge, Weyer's Cave, and the Caverns of Luray.

Other noted springs in the United States are Avon, Chittenango, Clifton, Columbia, Lebanon, Massena, Richfield, and Valleria in New York; Bedford Crossing, Doubling Gap, Gettysburg, Minnequa, Mount Holly, and Perry Warm, in Pennsylvania; Abenakis, Alburg, Clarendon, Highgate, Middleton, Missisquoi, and Sheldon in Vermont; Berkshire Soda and Sand, in Massachusetts; Stafford, in Connecticut; Blue, Green Cove, Green Sulphur, Silver, Suwanee, and Wakulla, in Florida; Glen Alpine, Warm, and Wilson's, in North Carolina; Glen and Limestone, in South Carolina; and Indian, New Holland, Porter, and Warm, in Georgia.

NOTABLE FALLS IN THE UNITED STATES.—*Niagara*, the most celebrated cataract in the world, is on Niagara River, twenty-two miles north of Lake Erie, and fourteen miles south of Lake Ontario. Goat Island separates the falls into the American, 164 feet high, and the Canadian, or Horseshoe, 158 feet high. The principal places visited are Goat Island, the Rapids, Luna Island, Cave of the Winds, the Three Sisters, Prospect Park, the new Suspension Bridge, Table Rock, and the passage under the Horseshoe Fall.

Trenton Falls are on West Canada Creek, fifteen miles northwest of Utica, N. Y. The falls consists of a series of six beautiful cascades and cataracts, having an aggregate descent of 312 feet in two miles. The place is a popular summer resort, and is celebrated for the wild and varied beauty of its scenery.

The Waterfalls of New York are a noteworthy feature of its natural scenery. Baker's Falls are 70 feet high, Birmingham 70, Black Chasm 300, Buttermilk 100, Carthage 75, Cauterskill 180, 80, and 40, Clavsrack 90, Cohoes 70, Corinth 60, Fawnleap 30, Genesee 96, 25, and 84, Glen's 60, Hadley's 60, Haines' 150, 80, and 60, Hoosac 40, Ithaca 160, Little 44, Lodi 125, Lyon's 63, Luzerne 25, Portage 70, 110, and 90, Roaring Brook 500, Sawkill 80, Split Rock 100, Taghkanic 215, Tekaharawa 100, Ticonderoga 100 and 30, Piercefield and Rainbow Falls in the Adirondacks, Shelving Rock Fall near Lake George, and the Falls in Watkins Glens are pretty cascades.

Yosemite, the highest water-fall in the world, is

in Mariposa county Cal., where the Yosemite Creek plunges 2,600 feet into the Yosemite Valley. There is first a clear fall of 1,500 feet then a series of cascades aggregating 600 to 700 feet and finally a plunge of 400 feet to the base of the precipice. In the same valley are the beautiful Bridal-Veil Fall, 900 feet, Virgin's Tears 1,000, Illilouette 600, Vernal 400, and Nevada 600.

Other Famous Falls in the United States are the Austin, in Me., 100 feet high; Belden's, Vt., 37; Bellows, N. H. and Vt., 40; Berlin, N. H., 80; Carp, Mich., 200; Chattahoochee, Ga., 110; Clifton, O., 60; Crystal Cascade, N. H., 80; Dead River, Mich., 96; Georgiana, N. H., 80 and 80; Glen Ellis, N. H., 80; Great, Neb., 88; Housatonic, Conn., 60; Lewiston, Me., 100; Minnehaha, Minn., 60; Passaic, N. J., 70; Potomac, Va., 76; Punccheon Run Cascades, Va., 1,800; Rumford, Me., 150; St. Anthony, Minn., 18; Saco, Me., 72; Shelburne, Mass., 150; Shoshone, Idaho, 200; Silver Cascade, N. H., 800; Sylvan Glade, N. H., 174; Tallulah Falls and Rapids, Ga., 86; Willamette, Ore., 40; Yellowstone, Mon., 140 and 360.

MOUNTAIN RESORTS.—*The White Mountains*, the "Switzerland of America," rise in two groups from a plateau in New Hampshire 1,300 square miles in area, and 1,600 feet high. In the east group Mt. Washington is 6,285 feet high, Adams 5,759, Jefferson 5,657, Madison 5,415, Monroe 5,349, Franklin 4,850, Pleasant 4,712. The Principal centers of interest are North Conway, the Glen House, Gorham, the Notch, the Crawford House, the Fabyan House, and the Twin Mountain House. In the West or *Franconian Groupe* Mt. Lafayette is 5,290 feet high, Profile, Haystack, Flume, and Twin over 4,000. The principal points are the Profile House and the Old Man of the Mountain.

The Green Mountains extend from south to north through Vermont. The highest summits are Mt. Mansfield 4,248 feet, Camel's Hump 4,188, Kellington Peak 3,924, and Ascutney 3,320. Waterbury, Stowe, and Rutland are popular summer resorts.

The Adirondacks, in northern New York are five parallel ranges of more than 500 mountains, traversing a plateau 15,000 square miles in extent, and nearly 2,000 feet high, from the southwest to Lake Champlain. Mt. Marcy is 5,337 feet high, Seward, M'Intyre, M'Martin, Whiteface, Dix Peak, Colden, Sanantonio, Snowy and Pharaoh, about 5,000. There is a labyrinth of over 1,000 lakes, and the region is one vast wilderness. A popular ten days' tour is from Crown Point to Roof's, to Tahawus, to Long Lake, to Tahawus, to Adirondack, to summit of Mt. Marcy, to Indian Pass, to North Elba, to Martin's, to Keesville and Ausable Chasm.

The Catskills, are west of the Hudson and south of the Mohawk, Slide Mt. is 4,205 feet high, Hunter 4,050, Round Top 3,800, High Peak 3,720, the Mountain House, on a terrace of Pine Orchard Mountain, 12 miles west of Catskill 2,500, and the Overlook Mountain House, near Rondout, about 3,000.

The Hudson Highlands are on both sides of the Hudson, between Cornwall and Peekskill. Beacon Hill is 1,685 feet high, Storm King 1,529, Cro' Nest 1,423, Breakneck 1,187, Anthony's Nose 1,128, Sugar Loaf 865.

Other Mountain Resorts are the Shawangunk Region northwest of the Hudson Highlands, Schooler's Mt. in the New Jersey Highlands, Delaware Water Gap in the Kittatinny Gorge, the Wyoming Valley, the Juniata Valley in the Alleghenies, Mauch Chunk and the Lehigh Valley, the Virginia Springs Region, Asheville and the Mountain Region of North Carolina, South Carolina and Georgia, Denver and the Natural Parks of Colorado, the Yellowstone Park and the Yosemite Valley.

Mt. Mitchell in North Carolina, 6,701 feet high, is the highest peak east of the Mississippi. Mt. Whitney in California, 15,086 feet, the highest in the United States.

THE LAKE REGIONS.—The Great Lakes abound in summer resorts, and afford a delightful summer trip. The Twelve Apostles' Islands, the Grand Portal, and the famous Pictured Rocks of Lake Superior, Mackinaw Islands in Lake Huron, and Put-in-Bay Islands, including Kelly's Island, in Lake Erie, are objects of peculiar interest.

The Lake of the Thousand Islands, an expansion of the St. Lawrence near Lake Ontario, is forty miles long, and four miles wide. Some 2,000 islands, of every imaginable shape and size, present an endless variety of charming scenery. Alexandria Bay, the chief resort, is on the New York side, and eight miles southeast are the romantic Lakes of Theresa.

Lake George, the most famous of American lakes, is in Northern New York, southeast of the Adirondacks. It is one to four miles wide, and thirty-six miles long, from Caldwell, sixty miles north of Albany north-northeast, to its outlet into Lake Champlain. The waters are very clear, and in some places 400 feet deep, and the surface is studded with about 300 islands.

Lake Champlain, celebrated for its magnificent scenery, lies between the Adirondacks and the Green Mountains, and forms nearly two thirds of the boundary between New York and Vermont. It is 126 miles long from south to north, from a few rods to fifteen miles wide, 55 to 400 feet deep, and contains about fifty islands. Whitehall is at the south end, seventy-seven miles from Albany; Ticonderoga, Crown Point, Port Kent, and Plattsburg are on the west, Burlington and St. Albans on the east and Rouse's point at the outlet into the Sorel River on the north.

Lake Winnepesaukee, south of the White Mountains, in New Hampshire, is a beautiful sheet of pure, translucent water, twenty-five miles long, and one to ten miles wide, inclosing numerous islands, and surrounded by very picturesque mountain scenery. In the vicinity are Mt. Belknap, Coppie Crown, Mt. Red Hill, and Ossipee, Squam, and Newfound Lakes. Sunapee Lake is thirty-five miles southwest.

Lake Memphremagog, in Vermont and Canada, is thirty miles long from south to north, and two to four wide. The waters are very cool and clear, and dotted with many beautiful islands. To the west are Jay Peak and Owl's Head, and twenty-eight miles south the lovely crescent shaped Willoughby Lake, seven miles long and from a half a mile to two miles wide, and of unknown depth, lies between Mt. Pisgah and Mt. Hor.

Moosehead Lake, the largest in Maine, is a deep and irregular body of water at the head of Kennebec River, 1,023 feet above the sea. Mt. Kines rises on the west shore. To the south the Rangeley Lakes unite with the Magalloway River to form the Androscoggin. Sebago Lake is seventeen miles northwest of Portland; three miles farther northwest is Long Lake. Other principal lakes in Maine are Baskahegan, Chesuncook, Eagle, Grand, Pamadumcook, and Schoodic.

Chataugua Lake, the highest navigable water in New York, is in the extreme west corner of New York. It is within eight miles of Lake Erie, and 726 feet above it, but empties its waters through the Conewango, Allegheny, Ohio, and Mississippi rivers into the Gulf of Mexico. Honeyoe, Hemlock, Canadice, Conesus, and Silver Lake, to the east, empty into the Genesee River.

Watkins Glen, at the head of Seneca Lake, is one of the principal attractions of a group of fifteen beautiful lakes in central New York, including

Canandaigua, Keuka or Crooked, Seneca, Cayuga, Owasco, Skaneateles, Cross, Otisco, Onondago, and Oneida, whose general outlet is Oswego River. Havana, Montour, and Excelsior Glens are also in this vicinity. Otsego, Schuyler, Cazenovia, and Summit Lakes, farther east, empty into the Susquehanna.

Lake Mahopac is in the southeast corner of New York, fifty-one miles north of New York. In the northeast of New York are some 200 lovely lakes and lakelets, besides more than 1,000, including the Saranacs and Fultons, Placid, Long, Tupper, St. Regis, Colden, Avalanche, Scroon, Henderson, Sanford, Eckford, Raquette, Forked, Newcomb, and Pleasant Lakes in the Adirondacks. Round Lake, noted for its camp-meetings, is twelve miles south of Saratoga. Greenwood Lake, the "Miniature Lake George," is in New York and New Jersey, forty miles north-northwest of New York; and in the New Jersey Highlands are Hopatcong, Budd's, and other pretty lakes.

Other Frequent Lakes are: Alpine, Col.; Bald Eagle, Minn.; Bass, Minn.; Beaver, Col.; Bomoseen, Vt.; Bradford, Fla.; Brood of Lakelets, Mich.; Calhoun, Minn.; Cedar, Minn.; Cherry, Fla.; Chicago, Col.; Chocoma, N. H.; Clear, Cal.; Como, Minn.; Cupscopic, Me.; Devil's, Dak.; Donner, Cal.; Dunmore, Vt.; Echo, N. H.; Francis, Fla.; George, Fla.; Harris, Fla.; Grand, Col.; Great Salt, Utah; Green, Col.; Harney, Fla.; Harriett, Minn.; Jackson, Fla.; Jessup, Fla.; Kenoza, Mass.; Lafayette, Fla.; Little George, Fla.; Lula, Tenn.; Mahkeenac, Mass.; Mary, Fla.; Mikkosukie, Fla.; Minnetonka, Minn.; Mirror, Cal.; Mollychunkemunk, Me.; Mono, Cal.; Monroe, Fla.; Mooselucmaguntic, Me.; Never-Freezing, Mon.; Onota, Mass.; Parmachene, Me.; Pellican, Minn.; Pend D'Oreille, Mon.; Pepin, Minn.; Ponchartrain, La.; Pontosue, Mass.; Profile, N. H.; Pyramid, Nev.; Rachel, Fla.; St. Catherine, Vt.; Salt, Fla.; San Luis, Col.; Santa Fé, Fla.; Spring, Mich.; Stockbridge Bowl, Mass.; Tahoe, Cal.; Tulare, Cal.; Twin, Col.; Wellborn, Fla.; Welokennebacooc, Me.; White Bear, Minn.; Wild-geese Nest, Dak.; and Yellowstone, Mon.

WESTERN STATES.—SPRINGS.—*Boiling Springs* are situated in southern Colorado, near the foot of Pike's Peak, about ten miles from the City of Pueblo, at an altitude of 6,350 feet above the level of the sea.

Calistoga, one of the most celebrated watering-places of the far West, is situated in Napa county, California, sixty-eight miles north of San Francisco. Its mineral springs are boiling hot. There is a large public swimming-bath of warm water. Five miles from here is the celebrated petrified forest.

Colorado Springs, is the name of a beautiful and flourishing village situated about five miles from the famous group of springs known as Manitou, sixteen miles from Pike's Peak, five from Cheyenne Cañon, five from Glen Eyrie, (the beautiful summer residence of General Palmer, president of the Denver & Rio Grand Railroad), eight from Monument Park, and four from the Garden of the Gods. The streets are well shaded, and the village is built upon the open plane in full view of the mountains. Its drives are a great attraction. Colorado Springs is fast becoming the Saratoga of Colorado. Hotel accommodations, guides, horses, and all that the tourist requires, are here to be had in abundance.

The Geysers, of Wyoming, are the grandest and most numerous intermittent spouting thermal springs in the world. They occur in the Yellowstone region, and are situated on Fire-Hole River. They lie in two groups; the Lower Basin, as it is called, containing an immense number both of geysers

and springs; and the Upper Basin, about eight miles south, including the famous geysers known as Old Faithful, the Giantess, the Grand Geyser, and the Giant Geyser. The average temperature of these is over 170 degrees.

Geyser Springs, the famous thermal springs of California, whose waters are celebrated as a specific for gout, rheumatism, and cutaneous diseases, are situated near the Pleuton River, in a lateral gorge of the Napa Valley known as the Devil's Cañon. A great number of springs, differing in temperature, in degrees of activity, in color, in taste, and in smell, issue from the base of steep hills which surround the Geyser ravine, and which bear evidence of volcanic action. The ground in the immediate vicinity of the springs is hot and devoid of vegetation, but the surrounding scenery is among the most beautiful in the world. Bayard Taylor thought that it surpassed anything he had seen in the Lower Alps for loveliness.

Gilroy Hot Springs. These medicinal springs of Southern California are situated east of the Southern Pacific Railroad, fifteen miles from Gilroy Station.

Harbin's Springs, twenty miles from the terminus of the Napa branch of the California Pacific Railroad, are among the most noted of the numerous mineral springs which abound in that vicinity.

Hot Springs of Arkansas. These famous springs are situated on the Hot Springs Railroad, near the Washita River, sixty-five miles from Little Rock. Numerous thermal springs, containing carbonic acid and several carbonates in solution, issue from the side of Hot Springs Mountain, discharging some 500,000 gallons daily. These waters are fast attaining a world-wide celebrity for the cure of various rheumatic, scrofulous, and other chronic diseases, and the place is already one of the most noted health-resorts in the United States. First settled in 1820.

Hot Sulphur Springs, near Santa Barbara, are much frequented by the health-seekers of Southern California. In some of these springs the water is impregnated with iron, alumina and potash; in others with sulphur and sulphuretted hydrogen.

Hot Sulphur Springs, a principal point of interest with visitors to the great Middle Park of Colorado, are situated on a tributary of Grand River, some forty-five miles from Georgetown and sixty from Central City. The waters are used for bathing in cases of chronic cutaneous affections, neuralgia, and rheumatism.

Hot Sulphur Springs, on the Northern Railway, California, are situated about ten miles west of Williams Station. Quantities of crude sulphur are here found, and the springs are much resorted to by invalids.

Idaho Springs, Colorado, on the Georgetown branch of the Colorado Central Railway, give their name to a beautiful village, nearly 8,000 feet above sea-level, and surrounded by high mountain ranges. The waters are both hot and cold, and are impregnated with iron, magnesia, lime and soda. The arrangements for bathing and swimming are extensive, and these springs are much resorted to both winter and summer, for the cure of rheumatism, paralysis, and general debility.

Litton's Springs, a favorite watering-place in Sonoma county, California, are situated about a mile from Litton Station, on the San Francisco and North Pacific Railway.

Hot Spring Valley, south of the Union Pacific Railroad, and about twenty miles west of Palisade, Nevada, contains a large number of intermittent hot springs. The waters are highly impregnated with sulphur, and shoot up from the ground in

muddy streams from twenty to thirty feet into the air.

Hot Springs, near San Bernardino, California, contain lime, soda, iron and alumina, and are said to possess medicinal properties.

Cottonwood Springs, twelve in number, are located a few miles from Buena Vista, 135 miles from Denver. A fine hotel, sanitarium, and bath-house have been erected, and many sufferers from rheumatism and other chronic diseases are patrons.

El Dorado Springs, five in number, having different medicinal qualities, are located in Arkansas, on the western slope and base of the Ozark Mountains, three miles from the Indian Territory, and 35 from Vinta Station on the Missouri Pacific Railway. These springs are in a beautiful country of streams and mountains, and in a latitude which climatic charts place in a most genial climate.

Deanesbury Mineral Springs, in Platte Cañon, twenty-seven miles from Denver, is a location delightfully romantic and wild. Fish and game abound, and the hotel accommodations are good. The water is highly beneficial in cases where laxative and alternative treatment is required.

Hartsell Hot Springs are situated on the South Platte River, in the southern portion of South Park, 104 miles from Denver. The water is celebrated for its cure of rheumatism, neuralgia, and chronic diseases.

Heywood Springs, on the line of the Gunnison extension of the Denver and South Park Division, 148 miles from Denver, possess water of a very high temperature, and are attracting much attention now that they are accessible by rail. Though hot, they are agreeable to drink.

Las Vegas Hot Springs.—The Hot Springs of Las Vegas, twenty-two in number, are located near the mouth of a beautiful cañon, which opens upon the plains four miles above the city of Las Vegas, and from that point winds romantically into the Spanish Range of the Rocky Mountains, the latter extending 150 miles southward from the Colorado line into New Mexico. The springs have an altitude of 6,400 feet—the elevation which has made Colorado such a favorite resort for those affected with pulmonary complaints. The character of the waters is similar to that of the famous Hot Springs of Arkansas.

Leadville Soda Springs are among the most prominent health and pleasure resorts in Colorado, and they attract many visitors.

Morrison Springs are situated sixteen miles from Denver, on a branch of the South Park Division, on Bear Creek. The waters are cold, sulphurous, alkaline, and very beneficial in cases of dyspepsia and kindred diseases, and are supposed to have a healing influence in kidney affections.

Ojo Caliente, the famous hot springs at Ojo Caliente, the largest and best in New Mexico. They are situated at a delightful altitude of 6,000 feet, and have proved very effective in severe cases of rheumatism, scrofula, and paralysis. The location is about eleven miles west of Barrance, and near the entrance of Comanche Cañon.

Poncho Springs, a group of over fifty hot mineral springs, five and a half miles from Arkansas, Col., composing the famous Poncho group.

Springdale Seltzer Springs, ten miles from Boulder, Colorado, in the midst of the rich mines, are reached by charming drives through pine forests, and by stage.

Sweet Springs, near Brownsville station, on the Missouri Pacific Railway, are about the center of Missouri, in an elevated, healthy region, 500 feet above St. Louis. Embraced in the spring grounds

are thirty acres, gently rolling and well drained, the surface ornamented with a beautiful turf of blue grass, and abundant shade trees.

Manitou Springs, the general name given to a group of seven famous mineral springs of Southern Colorado, known particularly as the Manitou, Navajo, Comanche, Shoshone, Arrapahoe, Mishana, Tunga, Pawnee. These waters possess valuable curative properties. They contain sulphur, but iron and soda prevail, and the springs are remarkable for their tonic effect in cases of general debility.

Napa Soda Springs, a famous health and pleasure resort of California, five miles from Napa City. These mineral waters have long been known, and are now quite extensively bottled for transportation, and freely used on the Pacific Coast.

Pacific Congress Springs, a favorite summer retreat four hours' ride from San Francisco, are situated ten miles southwest of Santa Clara. These waters are highly recommended by the medical faculty, especially in cases of rheumatism. They contain a large proportion of mineral contents, and closely resemble those of the Congress Spring of Saratoga. They contain chloride sodium, sulphate soda, carbonate soda, carbonate iron, carbonate lime, silicate alumina, and a little magnesia.

Pagosa Springs, located about four miles south of the San Juan River. Above and opposite the town, on a flat-topped, isolated hill, are the buildings (constructed chiefly of pine logs obtained in the vicinity) of the Government and military post. The great interest in the place centers in the boiling springs. The largest of these is at least forty feet in diameter, and hot enough to cook an egg or scald a pig in a few minutes. Carbonic acid gas and steam bubble up in great quantities from the bottom, and keep the water always in a state of agitation. The water has the faculty of dividing the light into its component colors, producing effects very similar to those of the opalescent glass of commerce. Around the large spring, and extending for a mile down the creek, are innumerable similar ones, many of which discharge large quantities of almost boiling water. These hot springs, being highly charged with saline material, have produced by deposition all, or nearly all, of the ground in their vicinity, and their streams meander through its cavernous structure, often disappearing and re-appearing many times before they finally discharge into the San Juan River. The place promises to grow into one of great popular resort.

Paso-Robles Hot Springs, situated on the Paso-Robles ("Pass of Oaks") ranch, in Southern California. It is said that there are no better waters on the American continent for gout, rheumatism, and skin diseases. They contain sulphuretted hydrogen, carbonic acid, soda, magnesia, potassa, iron, bromine, iodine, alumina, and sulphuretted acid.

Piedmont White Sulphur Springs, a short distance from East Oakland, near San Francisco, possess good medicinal qualities. They are quite strongly impregnated with sulphur.

Skaggs Springs, a popular resort, are situated in Sonoma county, Cal., and are easily accessible by stage from Geyersville, on the San Francisco & North Pacific Railroad.

Steamboat Springs, eleven miles south of Reno, Nev., are said to possess excellent medicinal qualities. They are quite hot, and are strongly impregnated with sulphur.

Soda Springs, near the foot of Summit Valley, Cal., are large and numerous, and are believed by many who have visited them to contain the best medicinal waters in the State. The drink is said

to be delightfully cool and sparkling, and to possess the taste of the best quality of artificial soda-water. Near the springs are also others which emit clear boiling-hot water.

Utah Hot Springs, on the Utah & Northern Railway, five miles from Ogden, clustered at the base of a rugged spur of the Wasatch range, are some mineral springs of great volume, and reputed to possess rare medicinal virtues. The water pours from crevices in the rocks, registering a temperature of 125 degrees, and containing such ingredients as chloride of sodium, iron, magnesium, and niter in strong solution. Baths here prove remarkably invigorating, and seem especially adapted to the cure of rheumatism and kindred chronic troubles. A large pool has been neatly walled up. These walls and the pebbly aisles surrounding, through which other springs send their waters to the great salt sea a few hundred rods below, are coated with a pretty, reddish, mineralized substance.

Warm Sulphur Springs, in Utah, inside the limits of Salt Lake City, and at the foot of a spur of the Wasatch mountains; temperature, 95 degrees to 104 degrees; emit 10,000 gallons per hour. Great bath houses of various kinds have been erected adjacent to grassy lawns and noble trees. Large numbers of visitors are attracted by the springs. A mile north are the Hot Sulphur Springs. The water spurts out with great force at a temperature of 200 degrees or more. Eggs thrust into the pools boil in about regulation time, and meat can be cooked thoroughly (and seasoned, too!) in an incredibly short period. Flowing out into the meadow near-by, the water has formed a pretty little lake, called Hot Springs Lake, a strange feature of which is the fact that trout and other fish have been seen in it, apparently flourishing in the tropical and sulphur-scented waters. Large volumes of steam are often noticeable over the springs and along the streams.

White Mountain Hot Springs, the most remarkable group of thermal springs in the world, are situated on Gardner's River, extending for about 1,000 feet up the slope of the White Mountain, in Montana.

White Sulphur Springs, near Calistoga, Cal., are situated in a very deep gorge, from which the mountains on both sides rise to a height of nearly 1,000 feet.

OTHER PLEASURE RESORTS.—*The Berkshire Hills*, between the Taconic and Hoosac ranges in Western Mass., the Housatonic Valley below the hills, and the Connecticut Valley from northern New Hampshire and Vermont, through Massachusetts and Connecticut to the Sound are celebrated for the picturesque beauty of their scenery. The Connecticut shore of the Sound has many summer resorts. Rye, Mamaroneck, New Rochelle, City Island, and Glen Island belong to New York; Staten Island, the largest in New York Harbor, is a popular resort.

Old Point Comfort is a popular summer and winter resort at the entrance of Hampden Roads in Virginia, thirteen miles north of Norfolk, and in the immediate vicinity of Fortress Monroe. Deer Park, Mountain Lake Park and Oakland are on the Baltimore & Ohio Railroad 240-46 miles west of Baltimore. Charleston, Aiken, and Somerville in South Carolina, Savannah, Augusta, Thomasville, and Eastman in Georgia, and Jacksonville, St. Augustine, Fernandina, Gainesville, Cedar Keys, the St. John's, Oklawaha, and Indian Rivers, Lake City, Welborn, Olustee, Tallahassee, Wakulla Spring, Quincy, Monticello, Madison, Pensacola, Appalachicola, Tampa, Manatee, Charlotte, Harbor, Punta Rassa, Biscayne Bay, and Key West, in Florida, are noted winter resorts.

The *Tour of the Mississippi* begins at St. Paul, Minneapolis, St. Anthony, and the Falls of St. Anthony. Lake Pepin, Maiden Rock, Chimney Rock, Trempealeau Island, Eagle Rock, Rock Island, and the Meeting of the Waters are above St. Louis. A winter voyage down the Lower Mississippi is a delightful experience. Madison, Wis., beautifully situated between Lakes Monona and Mendota, is a popular summer resort.

The *Yosemite Valley* is on the Merced River, in California, 140 miles east of San Francisco. It is six miles long, nearly one mile wide, nearly one mile in depth below the general level of the surrounding country, and inclosed in perpendicular granite walls 3,000 to 6,000 feet high. Its floor is clean and generally level, and carpeted with a profusion of brilliant and fragrant flowers, and its domes and waterfalls are the wonder of the world. Other principal resorts in California are San Rafael, Pescadero, Santa Cruz, Monterey, San José, Santa Clara, Napa City, Calistoga, Santa Barbara, San Diego, Los Angeles, and San Bernardino.

CANADA.—*Cacouna*, the favorite summer resort of the Canadians, is on the south shore of the St. Lawrence, 133 miles below Quebec. Above are *Rivière du Loup*, *Murray Bay*, and *Chateau Richer*; below are *Trois Pistoles*, *Ramoussi*, *Metis*, and *Cape Rosier*; nearly opposite *Cacouna* is the mouth of the famous *Saguena*. Noted mineral springs of Canada are *St. Leon*, *Caledonia*, and *St. Catherine's*. The principal falls are *Montmorency*, 250 feet high; *Falls of the Chaudière*, 150; *Great and Little Chaudière Falls of the Ottawa*, 40 and 13; *Shawanegan*, 150; *St. Anne*, 130, and *Falls of the Du Loup*, 80.

PLEBICITE, the name given, in the political phraseology of modern France, to a decree of the nation obtained by an appeal to universal suffrage. Thus, *Louis Napoleon*, for example, was chosen president, and subsequently emperor, by a plebiscite. The word is borrowed from the Latin; but the *plebiscitum* of the Romans properly meant only a law passed at the *Comitia Tributa*, that is, assembly of the *plebs*, or "commons," as distinguished from the *populus*, or the "nobles," and although it was ultimately obligatory on both classes of the community, it, of course, could only refer to such matters as it was within the province of the *Comitia Tributa* to legislate upon, and could not fundamentally alter or destroy the constitution.

PLEIADES, in Greek mythology, according to the most general account, the seven daughters of *Atlas* and *Pleione*, the daughter of *Oceanus*. Their history is differently related by the Greek mythologists.

PLEURODYNIA, a rheumatic affection of the intercostal muscles, characterized by acute pain in the side upon taking a full breath or coughing, and by great tenderness on pressure. The disease generally yields to local measures, such as blistering, or counter-irritation in a milder form by rubefacient liniments. A mixture of soap-liniment and chloroform rubbed over the affected parts two or three times a day, often gives relief. In the more persistent cases, leeches may be applied with benefit.

PLIFLIMMON, or PLYNLIMMON, a mountain of Wales, 2,481 feet high, on the boundary between the counties of *Montgomery* and *Cardigan*, eleven miles northwest from *Llanidloes*. It is a huge mountain mass, with three chief summits. The view from the summit is very extensive. It was in the fastnesses of *Plinlimmon* that *Owen Glendower* took his stand in 1401, issuing thence to make inroads on the English borders.

PLJESHTI, or PLOVESTI, a town of *Walachia*, thirty-five miles north-by-east from *Bucharest*, on

the *Dinbow*, a feeder of the *Jalomnita*. It is a place of considerable trade, and has a great annual wool-fair. Population about 27,000.

PLOUGH. See *Britannica*, Vol. I, p. 311.

PLOUGHGATE OF LAND: in the law of Scotland, an expression denoting a quantity of land of the extent of 100 acres Scots. No person is qualified to kill game in Scotland who has not a ploughgate of land.

PLUM. See *Britannica*, Vol. XIX, p. 230.

Of the plum tree (*Prunus*) there are four species native in America. The *Chickasaw plum* (*P. Chickasaw*) is a small shrub-like tree in the Southern States. It bears a yellowish-red globose fruit of agreeable flavor. The wild yellow or red plum (*P. Americana*) is a bushy tree 10-20 feet high. It bears a roundish, oval fruit, of one and a half inch diameter. It grows wild in most States, and has also been cultivated. The beach plum (*P. maritima*) is a low, straggling shrub, which is found on sandy casts from *Massachusetts* to *New Jersey*. Its fruit is three-fourths inch in diameter, and of pleasant taste, but slightly astringent. *Prunus glandulosa* occurs in *Texas*. It is scarcely a foot high, and has crooked, thorny branches.

Plums of the finer cultivated varieties form choice table fruit. The inferior kinds, being sour, are often used in pies, conserves, and sweetmeats. They should only be eaten when they are fully ripe. Dried plums pass under the name of "prunes." Great quantities are raised in *France*, *Spain*, *Turkey*, and *Germany*, and are imported into the United States. They are mostly sun-dried, and constitute a favorite table fruit. *Prunellos* are the finest grade of prunes. They are made from greengages and *St. Catherine* plums, and are highly esteemed for dessert.

PLUMB, *PRESTON B.*, an American statesman, born in *Delaware* county, *Ohio*, Oct. 12, 1837. He received a common school education; learned the art of printing; removed to *Kansas* in 1856; was a member of the *Leavenworth* constitutional convention in 1859; was admitted to the bar in 1861; served in the lower house of the *Legislature* in 1862, and was chairman of the *Judiciary* Committee, and subsequently reporter of the *Supreme* court; in August of the same year entered the service as second lieutenant in the eleventh *Kansas* infantry, and served successively as captain, major, and lieutenant-colonel of that regiment; was commissioned as colonel of the same regiment in August, 1862, but not mustered for the reason that a mustering officer was not within reach until after a part of the regiment had been mustered out; was a member and speaker of the *Kansas* house of representatives in 1867, and also a member in the following year; has been elected to the *United States Senate* for three successive terms, the last of which will expire March 3, 1895.

PLUMBAGO. See *Britannica*, Vol. XIX, pp. 230-231. This mineral, which is also called "graphite" and "black lead," is widely distributed in the United States. But it is in very few places found sufficiently pure for profitable mining. A mine in *Sonora, Cal.*, called the *Eureka* mine, is capable of yielding 1,000 tons per month. But most of the graphite now used in this country is mined at *Ti-conderoga, Essex* county, *New York*. There is a vein there about 15 feet thick carrying 12 per cent. of graphite. It is practically inexhaustible. It contains occasionally pockets of the purest graphite which is well adapted for pencil making, as it contains 99.9 per cent. of pure carbon.

Beside its use in the manufacture of lead pencils plumbago is largely employed in making crucibles and retorts. Its high resistance to heat adapts it

well for this purpose. Plumbago crucibles are especially used in the manufacture of Bessemer steel. Another important use is that of dry lubrication, as in producing smoothness of action between the frictional surfaces of the piano and organ. Plumbago thus applied must be absolutely free from grit. Of late years plumbago has come into extended use as a lubricant for machinery. For this purpose it is mixed with oily substances. If mixed in the proper proportion it makes a perfect lubricant. Plumbago is also used for pigments, for stove polish, and for facing molds in foundries in order to produce smooth surfaces in casting as it is a good conductor of electricity, it is also used for coating molds in electrotyping and in various other processes of electro-deposition.

PLUMBING, a word derived from *plumbum*, lead, the material of which water-pipes in houses were originally made. It comprises the laying of such pipes and the construction of the necessary apparatus for carrying water and drainage through houses, including hydrants, basins, water-closets, faucets, etc. The use of such work is very ancient, the nations of antiquity from Nebuchadnezzar downward, having employed lead or iron pipes to carry water through their cities. Galvanized iron is largely used in the United States instead of lead. But the most commonly used pipes are ungalvanized iron pipes. See SANITARY SCIENCE in these Revisions and Additions.



PLUMED-MOTH, the popular name of a group of small, delicate moths which compose the family *Pterophoridae*, or *Alucitidae*. They are remarkable for having at least a pair of the wings, and often all the wings, longitudinally

cleft into two or more—sometimes six—divisions, which are beautifully fringed at the edges.

PLUMER, WILLIAM SWAN, an American theologian, born in Pennsylvania in 1802, died in 1880. He was prominent as a professor of theology, and author of many valuable works on Biblical criticism.

PLUMPTRE, EDWARD HAYES, an English divine and educator, born in 1821. He became dean of Wells in 1881. He is a prolific writer of theological works.

PLUTEUS, in Classical Architecture, a wall filling up the space between two columns. Also the space between two orders, placed over one another, as in the amphitheatres.

PLUTONIC ROCKS, the name given by Lyell to the Granite Rocks, from the supposition that they were formed at considerable depth in the earth, and were cooled and crystallized slowly under great pressure. They were so designated in contradistinction to the volcanic rocks, which, though they have risen up from below, have cooled from a melted state more rapidly upon or near the surface.

PLYMOUTH, a city, the county-seat of Marshall county, Ind., on Yellow River, thirty miles northeast of La Porte. It contains several mills and has a good local trade. Population in 1890, 2,723.

PLYMOUTH, a town, the county-seat of Plymouth county, Mass. Population in 1890, 7,292. See Britannica, Vol. XIX, p. 238; Vol. XXIII, p. 729.

PLYMOUTH, a village of Michigan, about twenty-four miles northwest of Detroit. It produces a variety of manufactures, and has an excellent high-school.

PLYMOUTH, a village, the county-seat of Washington county, N. C., and a port of entry, near the mouth of the Roanoke. It is a shipping-point for lumber, shingles and cotton, is the seat of a State normal school, and has a good local trade.

PLYMOUTH, a village of Ohio, on the Huron River, thirty-five miles south of Sandusky. It produces a variety of manufactures.

PLYMOUTH, a borough of Pennsylvania. Population in 1890, 9,344. See Britannica, Vol. XIX, p. 238.

PLYMOUTH, a village of Wisconsin, an active center of local trade, on the Mullet River, thirty miles east of Fond-du-Lac.

PLYMOUTH BRETHERN, a sect which first appeared at Plymouth, England, in 1830. Twenty years afterwards they only possessed thirty-two places of worship in England and Wales. Mr. Darby, their founder, taught that all should be received into communion who confessed Christ, and acknowledged the inspiration of the Holy Ghost. They have no special order of ministers. The founder separated from the body before his death; their numbers now are considerable, and they are divided into various sects. Correct statistics of their actual numbers are not available, many of them being more or less connected with other religious bodies.

PLYMOUTH SOUND, a well-known roadstead on the southwest of Devonshire, important as a naval station. Its position at the entrance of the English Channel is much in its favor. It is two and a half miles wide, and extends inland for three miles.

PODURA, or PODOURA, a genus of small, wingless insects, corresponding to the order *Thysanura*, and typical of the family *Poduridae*. They have a linear or cylindrical body, a distinctly articulated thorax, rather long antennae, and a long abdomen, terminating in a tail, which divides at its extremity into two branches. They bend the tail beneath the abdomen, and by suddenly extending it, make prodigious leaps. Hence their popular name Spring-tail. The species of this and allied genera are numerous, and some are found on plants, some under stones and in other damp places, some on the surface of stagnant waters. Their bodies are covered with scales.

POET LAUREATE, an office in the household of the sovereigns of Great Britain, the appellation having its origin in a custom of the English Universities, which continued to 1512, of presenting a laurel leaf to graduates in rhetoric and versification, the king's "laureate" being a graduated rhetorician in the service of the king. The first appointment of a poet laureate dates from the reign of Edward IV., the first patent being granted in 1630. It was formerly the duty of the poet laureate to write an ode on the birthday of the monarch, but this custom has been discontinued since the reign of George III. Among those who have held this office may be mentioned Dryden, Southey, Wordsworth, and Lord Tennyson, the present poet laureate.

POCY Y ALOY, FELIPE, a Cuban naturalist, born at Havana in 1799. In 1842 he was appointed professor of comparative anatomy and zoology in the University of Havana. He made valuable researches in the natural history of Cuban fishes. His chief contributions to science are *Memoirs sobre la Historia Natural de la Isla de la Isla de Cuba* (2 vols.); *Synopsis Piscium Cubanum*, which was revised under the title *Enumeratio Piscium Cubanorum* (1875).

PAGONIAS, a genus of acanthopterous fishes, of the family *Seienuidae*, having two dorsal fins, one of

them deeply notched, and many small barbels under the mouth. The fishes of this genus are found on the coasts of warm countries; and are remarkable for the sounds which they emit, which somewhat resembled those of the drum, and have obtained for them the name of Drumfish.

POINDEXTER, GEORGE, an American lawyer and politician, born in Virginia in 1779, died in 1853. He was twice in Congress; was governor of Mississippi; was United States Senator; and reviser of the *Code* of laws of Mississippi.

POINSETT, JOEL ROBERTS, an American statesman, born in South Carolina in 1779, died in 1851. He studied in England and Scotland, and traveled much in early life; held several diplomatic positions; and became United States Secretary of War 1837. He was very popular in Chili and in Mexico.

POINT PLEASANT, a village, the county-seat of Mason county, W. Va., on the Ohio River, near the Kanawha. It produces a variety of manufactures.

POISONS. See *Britannica* Vol. XIX, pp. 276-279.

POITRINAL, or **PECTORAL**, in ancient armour, the horse's breastplate, formed of metal plates riveted together as a covering for the breast and shoulders.

POKHURN, a town of India, in the Rajpoot State of Jodhpoor, 340 miles southwest of Delhi. It is situated close to a deserted town of the same name, the site of which is marked by a very conspicuous temple in an elevated situation. Pokhurn being one of the great commercial tracks between Eastern Rajootana and Sind, gains much by the transit trade. Population about 15,000.

POLACCA, or **POLONAISE**, a Polish national dance of slow movement in three-fourths time. It always begins and terminates with a full bar, and a peculiar effect is produced by the position of its cadence, the dominant seventh in the second crochet of the bar preceding the trial on the third crochet.

POLACCA, or **POLACRE**, a species of vessel in use in the Mediterranean, with three masts and a jib-boom, the fore and main-masts being of one piece and the mizzen-mast with a top and top-mast. They generally carry square sails.

POLAND. For general article on **POLAND**, now incorporated with Russia, see *Britannica*, Vol. XIX, pp. 285-312. The latest statistical reports (those of 1887) give the area and population as follows: Area, 49,157 square miles; population, 8,319,797; density of population per square mile, 169. In 1885 the returns showed a population in towns, 2,125,458; in country, 5,834,846; males, 3,904,806; females, 4,055,998—a total of 7,960,804.

POLAND, a village of Ohio, five miles south of Youngstown. It contains mills and foundries and is a mining center.

POLAR REGIONS. See *Britannica*, Vol. XIX, pp. 315-330, and also **ARCTIC EXPLORATIONS** in these Revisions and Additions.

POLDER, a word of frequent occurrence in the topography of the Netherlands, being the name given to a piece of land below the level of the sea or nearest river, which, being originally a morass or lake, has been drained and brought under cultivation.

POLICE MATRONS. In March, 1891, the legislature of the State of New York passed, and the governor signed, a bill which makes the employment of women under this designation, in police stations, imperative in all cities containing 25,000 inhabitants or over. The special work of such matrons is to look after and care for all females

who are brought to the station, or who may have temporary lodgings there.

POLISHING OF METALS, a process that is effected by first removing any tarnish or oxidation by means of some material which will chemically act upon it. For this purpose, sulphuric, hydrochloric, oxalic and acetic acids are used to different metals and in various states of dilution. Usually, it is necessary to remove the acid with clean water and dry rapidly, to prevent re-oxidation; and then either friction with various polishing materials, or rubbing with a smooth, hard surface or burnisher brings out the lustre of the metal.

POLISHING SLATE, a mineral composed chiefly of silica, with a little alumina, lime, oxide of iron, and water; white, yellowish-white, or yellow; of a slaty texture, opaque, very brittle, and of specific gravity not much more than half that of water; so that it swims in water till its pores become filled with the liquid. It is found in Bohemia, Saxony, and Auvergne, and has been supposed to be a volcanic product, but it consists of silicious remains of *Diatomaceæ*. It is used for polishing glass, marble, and metals.

POLITICAL ECONOMY. See *Britannica*, Vol. XIX, pp. 346-401.

POLITICAL PARTIES IN THE UNITED STATES. **FEDERALISTS AND ANTI-FEDERALISTS**.—The advent of national political parties in the United States bears even date with the discussions incident to the formulation of national constitution. In 1787 when the convention called for that purpose and composed of delegates from the several States, had unanimously agreed upon the form, and had sent attested copies to the State legislature for their consideration and approval, an earnest discussion arose among the people in all directions as to its merits. Its friends deemed it important to prepare and circulate the strongest possible popular arguments in its behalf. A series of eighty-two able papers were prepared chiefly by Alexander Hamilton, of New York and sent out under the name of "The Federalist" strongly supporting the proposed constitution. Immediately those who favored the "Federalist" began to be called *Federalists* and their opponents *Anti-Federalists*. Prominent leaders of the former were Washington, Hamilton, Jay and Madison, while Thomas Jefferson was early recognized as the leader of the latter. Jefferson sought to attach the name *Republicans* or *Democratic Republicans* to the opposition, but with only partial success.

The *Federalists* came into power with the date of the accession of Washington to the Presidency, April 30, 1789. On September 11 of the same year Alexander Hamilton was appointed Secretary of the Treasury, and applied himself with great zeal, and remarkable success, to the relief of the government from the burden of its debt. He proposed that the debt of the Federal Government, and that war debts of the State governments, then aggregating about \$80,000,000 should be assumed by the general Government, and that provision made for their payment by revenue derived from customs and duties levied on ships. There was sharp opposition, but the plan was adopted, and the credit of the new Nation was assured. Two years later the United States bank was established with a capital of \$10,000,000, three-fourths of which was to be paid in United States stock, at six per cent. interest, thus furnishing a market for the new bonds of the Government.

Washington was re-elected without opposition in 1793; but during his second term a division of opinion arose in his cabinet, causing a serious rupture. This resulted, at his retirement, to a renewal of

party strife. The Federalists were led by Alexander Hamilton and Henry Knox; the anti-Federalists by Thomas Jefferson and Edmund Randolph. The Federalists were successful electing John Adams to the Presidency. Under the provisions of the electoral law then in operation, his competitor, Thomas Jefferson, having "the next highest number of votes" became vice-President. This led to a divided and embarrassed administration, resulting in the defeat of Adams for a second term, and the election of Jefferson to the Presidency. Thus at the end of twelve years, the power of the Federal party was destroyed.

DEMOCRATIC PARTY, THE.—The administration of the anti-Federalists began in 1801. Its members soon began to be called "Democrats," or Jefferson Democrats, and the other titles were gradually dropped. One of Mr. Jefferson's early acts was to transfer at once the chief offices to members of his own party; internal revenues were abolished, and the Sedition and Alien laws were repealed. He was reelected in 1805. The sympathy of the Democrats with France, as against England, whose conduct on the seas rendered her obnoxious to the people of the United States, caused the success of the party in the election of James Madison to the Presidency in 1809, and his reelection in 1813. The success of the administration in the war of 1812 still kept the party in power, as it did also during the two Presidential term of James Monroe. In the election of 1824 the party became divided. There were four presidential candidates—all claiming to be Democrats, viz: John Q. Adams, Andrew Jackson, Henry Clay and W. H. Crawford. As no candidate received a majority of all the electoral votes, the election was thrown into the House of Representatives, and Mr. Adams was elected President, John C. Calhoun being vice-President by the electoral votes. The next quadrennial election was without political party interest, and the choice one of popular personal preference resulting after a sharp struggle in the success of General Jackson, the "Hero of New Orleans." The political features of President Jackson's administration were the opposition to the United States Bank, the denial of the right of any State to nullify the laws of Congress, and the practical observance of the doctrine that to the party in power belongs the spoils of office.

In 1836, through the influence of General Jackson and his friends, Martin Van Buren was nominated and elected President. During his Administration the country passed through a severe commercial ordeal. The many State banks that had come into operation after the overthrow of the United States Bank, deluged the country with an inflated paper currency, and disaster followed. The people held the Administration responsible and in 1840 the opposition which had commenced during the incumbency of Jackson, became sufficiently strong to secure the election of General Harrison. Thus, after forty years of Government control, the anti-Federalists, and the Jeffersonian and Jacksonian Democrats suffered defeat at the polls.

WHIG PARTY, THE.—The organized opposition which began under President Jackson was under the leadership of Henry Clay and Daniel Webster. During the candidacy of Mr. Clay the opposition bore the name of *National Republican*, but later the name of the Whig Party. Its first great political success was that of 1840, named above. President Harrison died after holding the office for a single month and John Tyler, who had been elected vice-President with General Harrison, was inaugurated as the latter's successor.

The country was agitated during Mr. Tyler's Ad-

ministration by the question of the annexation of Texas, and on that issue the Whigs lost the position they nominally held. In 1848 they nominated and elected President Zachary Taylor, a popular general in the Mexican war. The slavery question was now constantly intruding itself, and both parties were trying to avoid its difficulties. Mr. Clay, on May 9, 1850, brought forward a series of compromises known as the Omnibus Bill, of which the concessions made to Texas, the admission of California as a free State, and a more stringent Fugitive Slave law were the chief features. During its consideration General Taylor died, and Millard Fillmore became President, July 9, 1850. The bill was passed complete Sept. 13, but did not satisfy the growing sentiment against slavery and the slave power. There was little heart in the party, and the death of Mr. Clay June 28, and of Mr. Webster, Oct. 24, 1851, tended still further to its decline. In 1852 it put forward General Winfield Scott as its candidate but not even his splendid military record saved the party from defeat. Franklin Pierce, the candidate of the Democrats was elected President, and the Whig party passed away.

ANTI-MASONIC PARTY, THE.—In 1826 William Morgan, who was preparing a revelation of the secrets of Free Masonry, suddenly disappeared. It was rumored that he had been foully dealt with by members of the order, and intense excitement was the result followed by the establishment of a political party based on opposition to the order. It cast in New York, in 1828, 30,000 votes; in 1829, 70,000; and about 128,000 in 1832. In 1832 it nominated William Wirt for President, but only carried one State—Vermont. In 1835 it elected Joseph Ritner governor of Pennsylvania. The excitement gradually died out and the party disappeared. William H. Seward owed his start in political life to this party which sent him to the New York Senate in 1830.

LIBERTY PARTY, THE. grew out of the Anti-Slavery Society, and was more widely known for the persistent agitation of its adherents than its numbers. In 1840 it nominated James G. Birney, secretary of the Anti-Slavery Society, for President, casting 7,069 votes; and again in 1844, when he received 62,300 votes. It contained such men as Lewis Tappan, Gerrit Smith, Samuel Lewis, and Salmon P. Chase. It merged into the Free Soil Party in 1848.

FREE SOIL PARTY, THE. was organized at Buffalo, N. Y., in 1848, and comprised the Liberty party, the Barnburners, (anti-slavery Democrats of New York), and anti-slavery Whigs. Their first candidate was Martin Van Buren, but he received no electoral votes. In 1852 it nominated John P. Hale, who met with no better success; and in 1856 it became part of the Republican party.

AMERICAN PARTY, THE. more generally known as Know-Nothings, appeared in 1854. It was based on a widely-spread secret society, and advocated twenty-one years' residence as a qualification for citizenship, and native-born citizens as office-holders. It swept the country like a tornado, carrying the elections in nearly every State. In 1856 it nominated Millard Fillmore for President, but the slavery question took precedence of everything else, and he received only 874,534 votes, after which the party disappeared.

CONSTITUTIONAL UNION PARTY, THE. consisted of moderate Southerners and some Webster Whigs. It claimed for its platform the Constitution of the United States and the enforcement of the laws. At its convention held May, 1860, it nominated John Bell for President and Edward Everett for Vice President. They received only thirty-nine elector-

THE PRESIDENTIAL ELECTION.—The subjoined table gives the list of the principal presidential candidates at each election from the date of the approval of the National constitution; the names of the States severally from which the candidates were selected; the names of the political parties with which they were affiliated; the dates severally of their elections; the total number of electoral votes cast in each election, and the number cast for each candidate; and the total number the popular vote for each of the chief candidates at each quadrennial election since 1824:

Presidential Candidates.	State Elected from.	Political Party.	Date of Popular Election.	Electors' Vote Counted by Congress.	Total States Voting.	Division of States.	Electoral Vote Rec'd by Each Candidate.	Total Electoral Vote.	Total Popular Vote for Each.
George Washington.....	Virginia.....	Federalist.....	Jan. 7, 1789	Apr. 6, 1789	10	69	69		
John Adams.....	Massachusetts.....	Federalist.....				34	34	91	
George Washington.....	Virginia.....	Federalist.....	Nov. 13, 1792	Feb. 13, 1793	15	132	132		
John Adams.....	Massachusetts.....	Federalist.....				77	77	135	
Thomas Jefferson.....	Massachusetts.....	Federalist.....	Nov. 8, 1796	Feb. 8, 1797	16	71	71		
Thomas Jefferson.....	Virginia.....	Dem.-Rep.....				67	67	138	
Aaron Burr.....	New York.....	Dem.-Rep.....	Nov. 11, 1800	Feb. 11, 1801	16	73	73		
Thomas Jefferson.....	Virginia.....	Dem.-Rep.....	Nov. 13, 1804	Feb. 13, 1805	17	162	162	188	
C. C. Pinckney.....	South Carolina.....	Federalist.....				2	14	176	
James Madison.....	Virginia.....	Dem.-Rep.....	Nov. 8, 1808	Feb. 8, 1809	17	122	122		
C. C. Pinckney.....	South Carolina.....	Federalist.....				5	47	176	
James Madison.....	Virginia.....	Dem.-Rep.....	Nov. 10, 1812	Feb. 10, 1813	18	11	128		
DeWitt Clinton.....	New York.....	Federalist.....				7	89	218	
James Monroe.....	Virginia.....	Dem.-Rep.....	Nov. 12, 1816	Feb. 12, 1817	19	163	163		
Rufus King.....	New York.....	Federalist.....				3	183	221	
James Monroe.....	Virginia.....	Dem.-Rep.....	Nov. 14, 1820	Feb. 14, 1821	24	24	231		
John Q. Adams.....	Massachusetts.....	Opposition.....				1	235		
J. Q. Adams.....	Massachusetts.....	Coalition.....	Nov. 9, 1824	Feb. 9, 1825	24	8	184	105,331	
Andrew Jackson.....	Tennessee.....	Dem.-Rep.....				10	99	261	155,872
Andrew Jackson.....	Tennessee.....	Nat.-Rep.....	Nov. 11, 1828	Feb. 11, 1829	24	15	178	647,231	
J. Q. Adams.....	Massachusetts.....	Democrat.....				9	85	261	509,097
Andrew Jackson.....	Tennessee.....	Democrat.....	Nov. 12, 1832	Feb. 13, 1833	24	15	219	687,502	
Henry Clay.....	Kentucky.....	Nat.-Rep.....				7	49	288	530,189
Martin Van Buren.....	New York.....	Democrat.....	Nov. 8, 1836	Feb. 8, 1837	26	15	170	761,549	
W. H. Harrison.....	Ohio.....	Whig.....				7	73	294	
W. H. Harrison.....	Ohio.....	Whig.....	Nov. 10, 1840	Feb. 19, 1841	26	19	234	1,275,017	
Martin Van Buren.....	Ohio.....	Democrat.....				7	60	294	1,128,702
James K. Polk.....	Tennessee.....	Democrat.....	Nov. 12, 1844	Feb. 12, 1845	26	15	170	1,337,243	
Henry Clay.....	Kentucky.....	Whig.....				11	105	275	1,299,088
Zachary Taylor.....	Louisiana.....	Whig.....	Nov. 7, 1848	Feb. 11, 1849	30	15	163	1,366,101	
Lewis Cass.....	Michigan.....	Democrat.....				15	127	290	1,220,544
Franklin Pierce.....	New Hampshire.....	Democrat.....	Nov. 2, 1852	Feb. 9, 1853	31	27	254	1,601,174	
Winfield Scott.....	New Jersey.....	Whig.....				4	42	296	2,386,578
James Buchanan.....	Pennsylvania.....	Democrat.....	Nov. 4, 1856	Feb. 11, 1857	31	19	174	1,838,169	
John C. Fremont.....	California.....	Republican.....				11	114	296	1,341,264
Abraham Lincoln.....	Illinois.....	Republican.....	Nov. 6, 1860	Feb. 13, 1861	33	17	180	1,866,352	
John C. Breckenridge.....	Kentucky.....	Democrat.....				11	73	303	845,765
Abraham Lincoln.....	Illinois.....	Republican.....	Nov. 8, 1864	Feb. 8, 1865	36	22	213	2,216,067	
George B. McClellan.....	New Jersey.....	Democrat.....				3	21	314	1,808,735
Ulysses S. Grant.....	Illinois.....	Republican.....	Nov. 3, 1868	Feb. 10, 1869	37	26	214	3,015,071	
Horatio Seymour.....	New York.....	Democrat.....				8	80	317	2,709,613
Ulysses S. Grant.....	Illinois.....	Republican.....	Nov. 5, 1872	Feb. 12, 1873	37	31	286	3,507,070	
Horace Greeley.....	New York.....	Dem.-Lib.....				6		366	2,834,079
R. B. Hayes.....	Ohio.....	Republican.....	Nov. 7, 1876	Feb. 14, 1877	38	17	185	4,033,976	
Samuel J. Tilden.....	New York.....	Democrat.....				21	184	369	4,284,873
James A. Garfield.....	Ohio.....	Republican.....	Nov. 2, 1880	Feb. 9, 1881	38	19	214	4,454,416	
W. S. Hancock.....	New York.....	Democrat.....				19	155	369	4,444,952
Grover Cleveland.....	New York.....	Democrat.....	Nov. 4, 1884	Feb. 11, 1885	38	20	219	4,874,986	
James G. Blaine.....	Maine.....	Republican.....				18	182	301	4,851,981
Benjamin Harrison.....	Indiana.....	Republican.....	Nov. 6, 1888	Feb. 13, 1889	38	20	233	5,440,708	
Grover Cleveland.....	New York.....	Democrat.....				18	168	401	5,586,242

* Tie vote; choice decided by House of Representatives on 36th ballot.

† No choice by Electoral College; choice decided by House of Representatives on first ballot.

The following table shows the summaries severally of the party votes, both popular and electoral, at the last Presidential election (Nov. 6, 1888), and also the party electoral votes cast at the previous five quadrennial elections:

States	*Popular Vote.						Electoral Vote.												
	1888.						1888.	1884.	1880.	1876.	1872.	1868.							
	Cleveland, D.	Harrison, R.	Fisk, P.	Streeter, U. L.	Cleveland's Plu- rality.	Harrison's Plu- rality.	Total Vote.	Cleveland, D.	Harrison, R.	Cleveland, D.	Blaine, R.	Hancock, D.	Garfield, E.	Tilden, D.	Hayes, R.	+Hendricks, D.	Grant, R.	Seymour, D.	Grant, R.
Alabama...	117,320	56,197	583		61,123		174,100	10		10		10		10			10		10
Arkansas...	85,962	58,752	641	10,613	27,210		155,968	7		7		6		6			6		6
California...	117,729	124,816	5,761		7,087		251,239	8	8	8	8	1	1	6	6		6	6	6
Colorado...	37,567	50,774	2,191	1,266	13,207		91,798	3	3	3	3	3	3	3	3		6		6
Connecticut...	74,920	73,584	4,234	240	336		153,978	6	6	6	6	6	6	6	6		6	6	6
Delaware...	16,414	12,973	400		3,441		29,787	3	3	3	3	3	3	3	3		3	3	3
Florida...	39,561	26,657	423		12,904		66,641	4		4		4		4			4		4
Georgia...	100,499	40,496	1,808	136	60,002		142,939	12		12		11		11			12		12
Illinois...	348,278	370,473	21,695	7,090	22,195		747,686	22	22	22	22	11	11	11	21	21	21	9	16
Indiana...	261,013	263,361	9,881	2,694	2,348		536,949	15	15	15	15	15	15	15	15	15	15	13	13
Iowa...	179,877	211,538	3,550	9,105	31,711		404,130	13	13	13	13	11	11	11	11	11	8	8	8
Kansas...	102,745	182,904	6,779	37,738	80,159		334,035	9	9	9	8	5	5	5	5	5	5	5	5
Kentucky...	183,800	155,134	5,235	632	28,666		344,781	13	13	13	12	12	12	12	8	8	11	7	7
Louisiana...	85,032	30,434	160	39	51,548		115,774	8	8	8	6	8	7	8	7	7	7	7	7
Maine...	50,181	73,734	2,691	1,344	23,253		128,250	6	6	6	6	7	7	8	8	8	7	7	7
Maryland...	108,168	99,986	4,767		6,182		210,921	8	8	8	8	8	8	8	8	8	7	7	7
Mass...	151,855	185,892	8,701		32,067		344,448	14	14	14	13	13	13	13	13	13	13	12	12
Michigan...	213,439	236,387	20,942	4,555	22,918		476,273	13	13	13	11	11	11	11	11	11	8	8	8
Minnesota...	104,385	142,492	13,311	1,094	38,107		263,306	7	7	7	7	5	5	5	5	5	6	4	4
Mississippi...	85,471	30,096	218	22	55,375		115,807	9	9	9	9	5	5	5	5	5	5	5	5
Missouri...	261,974	236,257	4,539	18,632	523,198		908,471	16	16	16	15	15	15	15	6	6	11	11	11
Nebraska...	80,552	108,425	9,429	4,226	25,717		202,653	5	5	5	3	3	3	3	3	3	3	3	3
Nevada...	5,326	7,229	41		1,903		12,596	3	3	3	3	3	3	3	3	3	3	3	3
New Hamp...	43,382	45,724	1,563	18	2,342		90,790	4	4	4	4	5	5	5	5	5	5	5	5
New Jersey...	151,498	144,344	7,904		908,471		303,471	9	9	9	9	9	9	9	9	9	7	7	7
New York...	685,757	648,759	30,231	636	13,092		1,330,109	36	36	36	35	35	35	35	35	35	33	33	33
N. Carolina...	147,902	131,784	2,789	47	13,118		285,512	11	11	11	10	10	10	10	10	10	10	9	9
Ohio...	396,455	416,064	24,356	3,496	19,599		841,941	23	23	23	22	22	22	22	22	22	22	21	21
Oregon...	26,622	33,291	1,677	863	6,769		61,911	3	3	3	3	3	3	3	3	3	3	3	3
Penn's lv'n'a	446,633	526,091	20,917	3,873	76,458		907,568	30	30	30	29	29	29	29	29	29	29	26	26
Rhode Isl'd	17,530	21,948	1,230	18	4,438		40,706	4	4	4	4	4	4	4	4	4	4	4	4
S. Carolina...	65,825	13,738			52,891		79,941	9	9	9	7	7	7	7	7	7	7	7	7
Tennessee...	158,779	138,988	5,969	48	19,791		303,736	12	12	12	12	12	12	12	12	12	12	10	10
Texas...	234,833	88,422	4,749	29,459	146,461		387,513	13	13	13	8	8	8	8	8	8	8	8	8
Vermont...	16,788	45,192	1,460		28,404		63,440	4	4	4	4	5	5	5	5	5	5	5	5
Virginia...	151,677	150,438	1,678		1,539		304,093	12	12	12	11	11	11	11	11	11	11	11	11
W. Virginia...	78,677	78,171	1,084	1,508	506		159,440	6	6	6	6	5	5	5	5	5	5	5	5
Wisconsin...	155,232	176,553	14,277	8,552	21,321		354,614	11	11	11	10	10	10	10	10	10	10	8	8
Total	5,538,233	5,440,216	249,907	148,105	576,158	478,141	11,392,382	168	233	219	182	155	214	184	185	42	286	80	214

*Count of the Electoral Commission. †In 1872 Horace Greeley, Democratic and Liberal-Republican candidate for President, having died before the electoral vote was cast, the Greeley electors voted as above for Thomas A. Hendricks in five States, Kentucky, Georgia, and Missouri cast 18 electoral votes for B. Gratz Brown, of Missouri, for President; Georgia 2 votes for C. J. Jenkins, of Georgia; Missouri, 1 vote for David Davis, of Illinois, and 17 votes irregularly cast were not counted by Congress.

N. B.—In addition to the popular votes given above, in 1888, for Messrs. Harrison, Cleveland, Fisk, and Streeter Illinois cast 140 and New York 2,668 for the "United Labor" candidate; and California cast 1,971 votes for Curtis, the "American" candidate.

al votes, and the outbreak of the war saw the end of the organization, which was mildly pro-slavery in its tendency.

PROHIBITION PARTY, THE, arose in Maine, where, in 1851, Neal Dow procured the passage of a law to prohibit the sale of intoxicating liquors as a beverage. In 1880-81 Kansas did the same, and the party has considerable following in the northwestern States. Its votes for President in 1872 were 5,603, James Black being its candidate; and in 1876 it cast 9,233 for Gerrit Smith. Its work has been chiefly directed to State reform. At the Presidential elections in 1888, Gen. Clinton B. Fisk, the Prohibition candidate received a total popular vote of 249,907.

REPUBLICAN PARTY, THE, composed chiefly of the Free Soil and Anti-Slavery wings of the former Whig party, held its first convention in Philadelphia, June 17, 1856, and nominated General John C. Fremont for President. The platform favored the admission of Kansas as a free State; the prohibition of slavery in all the Territories of the United States; the denial of the authority of Congress or of a Territorial legislature to give legal standing to slavery in any Territory—freedom being under the Constitution the public law of the national domain; and the right and duty of Congress to prohibit in all Territories polygamy and slavery. The Democratic convention was held in Cincinnati, in June, 1856, and nominated as its Presidential candidate James Buchanan. In its platform it denounced all attempts to prevent slavery in the District of Columbia or in the Territories by legislation, or to object to the admission of a new State on the ground that it established slavery; recognized the right to maintain slavery in any part of the public domain; and promised the faithful execution of the Fugitive Slave Law. The ensuing election resulted in giving Buchanan a majority of the electoral votes (chiefly from the South), but a minority of 377,629 out of a majority of a total popular vote of a little over 4,000,000. The Republican party, though defeated, polled a total popular vote of 1,341,284. Four years later Abraham Lincoln became the nominee of the party and was triumphantly elected. The Republicans successively carried all the succeeding elections except that of 1834, when Grover Cleveland was elected by the Democratic party. The Republicans have also held the majority control of the United States Senate since —, and also the majority control of the House of Representatives, except during the first two years of the administration of Mr. Cleveland, when the Democrats held a small majority. At the present writing, September, 1891, the President (whose term of office closes March 4, 1892), and a majority of the United States Senate are Republicans. The Democrats, in the election of 1891, succeeded in securing a large majority of the House of Representatives, for the Fifty-second Congress, the official term dating from March 4, 1891, to March 4, 1893.

GREENBACK PARTY, THE (called by its members the Independent National), was organized in 1876, and was the outgrowth of the Granger and Labor Reform movements. Its convention at Indianapolis in May, 1876, "demanded the unconditional repeal of the Specie Resumption Act of Jan. 14, 1875;" urged the issue of United States notes as a circulating medium, and the suppression of bank paper; and protesting against the further issuing of gold bonds, and the purchase of silver to replace the fractional currency. Peter Cooper was nominated for president, and received 81,740. In 1880 its candidate was James B. Weaver, who received 307,806. It has never gained any electoral votes.

UNION LABOR PARTY, THE, was practically formed during the Presidential canvass of 1888. It grew out of the efforts of the Labor Unions in many of the States to unite their political support in favor of a candidate definitely pledged to the support of their measures. The total popular vote of the party in the twenty-seven States in which its ballots were reported was 148,105.

POLK, LEONIDAS, an American divine and soldier, born in North Carolina in 1806. He graduated at West Point; became a minister of the Protestant Episcopal church; was missionary bishop in the West and Southwest; bishop of Louisiana, 1841; became a major-general in the Confederate army in 1861; was promoted to lieutenant-general, and was killed at Pine Mountain, June 14, 1864.

POLKA, a species of dance, of Polish or Hungarian origin, the music to which is in $\frac{3}{4}$ time, and has the rhythmical peculiarity of being accented in the third quaver of the measure. It was introduced as a fashionable dance into Western Europe about 1841.

POLLENZA, a well-built town in the northern part of the island of Majorca, about two miles west of the Bay of Pollenza, and twenty-eight northwest of Palma. It has a Jesuits' college and some manufactories of black woolen cloth. Population about 6,500.

POLLOCK, SIR CHARLES EDWARD, an English jurist, son of Sir Frederick Pollock, born in 1823, and called to the bar at the Inner Temple in 1847. He was appointed a baron of the exchequer in 1878. His patience and courtesy are proverbial, and he is highly popular with the bar. He is the author of a number of legal literary works.

POLLOCK, SIR FREDERICK, an English writer on jurisprudence, born in London in 1783, died in 1870. He was an eminent barrister; was attorney-general under Sir Robert Peel; and became chief baron of the exchequer and privy counselor in 1844.

POLO, a village of Illinois, about twelve miles north of Dixon. It manufactures harvesters and is an important trade center.

POLYGAMY, multiple marriage, or the condition of a man having two or more wives or of a woman having two or more husbands at the same time. The former condition is sometimes also called "polygyny" (many wives), and the latter "polyandry" (many husbands). In the first-mentioned form polygamy has existed in the East, and the fact is perhaps not unconnected with the remarkable fertility of Eastern women. Even the law of Moses did not forbid polygamy; but his code rather aimed to diminish certain of its evils, by providing several obstacles to its practice. The Scripture record abounds with instances of the restrictions by which the enjoyment of a multitude of wives was hampered. Though these latter were no doubt salutary in a sanitary point of view, yet we have no means of judging how far they accomplished their object; the polygamous usages themselves remained in force until a late date. In the time of Christ polygamy had almost fallen into desuetude among the Jews, which accounts for his silence respecting it, though indirectly his teaching was adverse to its practice. Polygamy was positively forbidden by the Roman law, but it was common among the Greeks. The Mohammedan religion allows a man but four wedded wives, but places no restrictions upon the number of concubines. The teachings of the Apostles were clearly in favor of monogamy, and on this point the Christian church has been steadfast in its teachings. In its missionary labors, however, the church has been confronted with the question of how to deal with heathen converts having a plurality of wives. Up to a few years ago the

only considerable body of polygamists, outside of Turkey and Asia, were Mormons. While Brigham Young was governor of Utah, the Mormons practiced polygamy without hindrance, and their delegate was admitted to Congress. After the Pacific Railroad was built and brought many persons to Utah, who were disgusted at the Mormon practices, polygamy was declared to be a crime, and those who practiced it were subject to heavy penalties including imprisonment. They were also deprived of their elective franchise. These laws have been strictly enforced and the consequence is that polygamy is practically stamped out in Utah at the present time, although it is still clandestinely practiced in a few isolated cases.

POLYSTYLE, a term applied to a building with a number of columns, but not the strict number of any of the classic arrangements.

POLYTECHNIC SCHOOLS, institutions intended for instruction in the practical applications of physics, chemistry and mathematics. They are called "scientific schools" in this country. The oldest of these is the Rensselaer Polytechnic Institute of Troy, N. Y. It was founded in 1824. In the same year the Franklin Institute was organized in Philadelphia. Both are still in existence, and have done excellent work. From time to time other similar schools were founded, so that by 1848 the Ohio Mechanics Institute was in existence, and scientific departments had been added to Yale and Harvard colleges, and to the University of Virginia. In 1862 Congress passed a law by which scientific and industrial schools in the several States obtained land-grants for their support. This act gave rise to a considerable number of such State schools. Some of them are in a flourishing condition to-day, and are excellently equipped with books and scientific apparatus. But in others the progress has been far from satisfactory. In addition to these endowed schools there are many un-endowed polytechnic institutions in which the instruction in practical science is quite thorough, and the equipment and scientific ability fully equal to that of similar schools in Europe.

The following table taken from the report of the Commissioner of Education, gives the statistical position of these schools in the United States in 1886. The statistics of schools of science endowed with the national land grant are given in the column under "With National Grant" and the statistics of other polytechnic schools under the head "Without."

	With National Grant.	Without.
Schools.....	45	42
Instructors.....	527	447
Students.....	5,882	4,263
Books in Libraries.....	100,286	138,613
Value of grounds, buildings, etc.....	\$5,182,455	\$2,004,426
Income from funds.....	405,507	129,895
Income from tuition fees.....	174,099	74,538
Income from State appropriations.....	383,390	444,305
Total income.....	\$562,996	\$648,738

See COLLEGES AND UNIVERSITIES IN THE UNITED STATES in these Revisions and Additions.

POMEROY, a city, the county-seat of Meigs county, Ohio, on the Ohio River, about twenty miles above Gallipolis. It contains several salt furnaces and coal mines, and is the center of a variety of industries. Population in 1890, 4,727.

POMEROY, JOHN NORTON, an American writer on jurisprudence, born at Rochester, N. Y., in 1828,

died in 1885. He was eminent as a legal practitioner and educator in his native State, and subsequently on the Pacific coast. Many of his legal works are standard text-books.

POMEROY, SAMUEL CLARKE, born in Southampton, Mass., in 1816, died at Whitinsville, Mass., in 1891. He was educated at Amherst; in 1852 was a member of the Massachusetts legislature, and was active in organizing the New England Emigrant Aid Company. In 1854 he conducted a colony to Kansas and settled in Lawrence. Thence he removed to Atchison, where he became mayor, and took a prominent part in the organization of the Territorial government. During the famine in 1860-61 he was president of the relief committee. In 1856 and 1860 he was a delegate to the National Republican conventions. In 1861 and 1867 he was elected as a Republican to the United States Senate, where he acquired the nickname of "Subsidy Pom," by his ardent support of all subsidy measures. He was a candidate for a third term, but charges of bribery were preferred against him in the Kansas legislature, and he was not elected. A committee was appointed to investigate the matter, and a majority report held that the charges were not sustained. The matter afterwards came before the courts, where, finally, a *nolle prosequi* was entered on the ground that there was not proof enough to secure a conviction. Mr. Pomeroy then made his home in Washington, where he was always deeply interested in "practical" politics.

POMEROY, SEYMOUR, a distinguished Revolutionary patriot and soldier, born in Massachusetts in 1706, died at Peekskill, N. Y., in 1777. He gained the victory as commander at Lake George, Sept. 8, 1755; was appointed brigadier-general by the Massachusetts provincial congress; fought as a private at Bunker Hill; declined an appointment as senior brigadier-general by the Continental congress; and headed a large force for the relief of Gen. Washington in 1778.

POMPEY, a village of New York, on a high ridge, about twelve miles south of Syracuse. It is the seat of an academy.

POMPTON, a village of New Jersey, at the head of Pompton River, fifteen miles northwest of Paterson. It is engaged in the manufacture of iron, and has a good local trade.

PONCE DE LEON, JUAN, a Spanish soldier, discoverer of Florida, born of an ancient family in San Servas, province of Campos, in 1460, died in Cuba in 1521. See Britannica, Vol. IX, p. 340.

PONCHO, an important article of male attire in Chili. It consists of a piece of woollen cloth, having in the middle a slit through which the wearer passes his head, so that the poncho rests upon his shoulders and hangs down before and behind. In the fashions of recent times, the poncho has been introduced in Europe.

POND, ENOCH, an American divine and author, born in Massachusetts in 1791, died in 1882. He edited "The Spirit of the Pilgrims," an orthodox magazine; and was long connected with the theological seminary at Bangor, Me.

PONDWEED (*Potamogeton*), a genus of plants having hermaphrodite flowers, sessile upon a spike or spadix, which issues from a sheathing bract or spathe, a perianth of four scales, four sessile anthers opposite to the scales of the perianth, four pistils, which become four small nuts, and a curved embryo. The species abound chiefly in the rivers, lakes, and ditches of the United States and Europe, but they are found also in other parts of the world, some of them in New Holland. They often present a beautiful appearance in clear streams and ponds.

PONGO (*Simia* or *Pithecus Wormbii*), an ape of the same genus as the Orang, but of much larger size, six feet or more from the heel to the crown of the head, covered with black hair, with which dark red hair is mingled. It is a native of Borneo, Sumatra, and probably of other neighboring islands, inhabiting the deepest recesses of the forests. It possesses great strength, and like the orang, is evidently adapted by its conformation for moving chiefly among the boughs of trees.

PONT-A-MOUSSON, a town of the German Empire in Lorraine. The Moselle flows through the town, which is situated in a fruitful valley. There is a fine Gothic church dedicated to St. Martin. Pont-a-Mousson has some manufactures of pottery. It was the birthplace of Marshal Duroc, the favorite and friend of Napoleon. Population, 8,115.

PONTE, LORENZO DA, an Italian poet, born at Ceneda, Venetia, in 1748, died at New York in 1838. He was professor of rhetoric in Venice, but was banished on account of his liberal opinions. In 1805 he came to New York. At the age of eighty he was made professor of the Italian language in Columbia College, New York. He wrote the librettos of several operas, among which were *Don Giovanni* and the *Marriage of Figaro*. His son, LORENZO L. DA PONTE (1805-1840) was professor in the University of the City of New York, and published a *History of the Florentine Republic* (1833).

PONTIAC (c. 1720-1769), a chief of the Ottawas. He defended the French at Detroit in 1746; garrisoned the unsuccessful attack on the English garrison at Detroit in 1763; carried on a war of extermination, and was murdered by a hired Illinois Indian in 1769.

PONTIAC, a city, the county-seat of Livingston county, Ill., on the Vermilion River, about thirty miles north of Bloomington. It is the seat of a State reform school, and is engaged in milling, mining and general trade. Population in 1890, 3,203.

PONTIAC, a city the county-seat of Oakland county, Mich., on Clinton River, twenty-five miles north of Detroit. It contains a large insane asylum and has several mills, foundries and brick-yards. Population in 1890, 6,243.

POOLE, STANLEY LANE, an English author and Orientalist, born at London in 1854. He gave attention to numismatics. In 1874 he was appointed by the trustees of the British museum to write the official *Catalogue of Oriental Coins* (eight vols.). To this a *Catalogue of Indian Coins* was added in 1885. As the result of a mission to Egypt in 1883 he wrote *Art of the Saracens* (1786). He contributed many articles to the ninth edition of the *Encyclopædia Britannica*; and published *Essays in Oriental Numismatics*; *Egypt*; *Speeches and Table-Talk of Mohammed*; *Social Life in Egypt*; *Coins and medals*, and *History of the Moors in Spain* (1886).—His uncle, REGINALD STUART POOLE, born at London in 1832, is also distinguished as an Egyptologist and numismatist. He has edited the *Official Catalogue of Greek, Roman, Oriental, and English Coins* in the British Museum, and has published several books on Oriental coins.

POOLE, WILLIAM FREDERICK, an American librarian and bibliographer, born in Massachusetts in 1821. He is author of several valuable indexes to periodical literature and has had charge of many important libraries.

POOR, ENOCH (1736-1780), a brigadier general in the Continental army, born in Massachusetts in 1736. He served against Burgoyne and against the Six Nations; commanded a brigade under Lafayette, and died in 1780, at Hackensack, where a monument has been erected to his memory.

POOR, BENJAMIN PERLEY, an American journalist, editor of the "Congressional Directory" born in Massachusetts in 1820, died in 1887. He was an industrious compiler and indexer of historical documents. His letters from Washington to various periodicals, and his *Reminiscences*, are valuable for their trustworthiness.

POPE, JOHN, an American general, born in 1822. He graduated at West Point; was promoted for bravery during the Mexican war; became brigadier-general of volunteers in 1861, and of regulars in 1862. After the battle of Bull Run he withdrew from command of the army of Virginia and took command in the Northwest. He was promoted to major-general in 1882, and was retired in 1886.

POPULATIONS OF THE WORLD.—For the general article on Population together with an elaborate discussion of numerous questions relating thereto, see *Britannica*, Vol. XIX, pp. 513-17. In the following summaries are recorded the figures of the latest accredited reports which had been authoritatively announced to Oct. 1, 1891.

POPULATION AND AREAS BY GRAND DIVISIONS.

	Population.	Areas in Square Miles:
Africa.....	127,000,000	11,514,000
America, North.....	89,250,000	6,446,000
America, South.....	36,430,000	6,807,000
Asia.....	890,000,000	14,710,000
Australasia.....	4,730,000	3,288,000
Europe.....	380,200,000	3,555,000
Polar Regions.....	300,000	4,888,800
Unexplored Regions.....	86,100,000	Not known.
Total.....	1,554,000,000	

POPULATION BY RACES.

African Race.....	178,000,000
American Indians.....	15,500,000
Caucasian Race.....	654,000,000
Malay Race.....	36,500,000
Mongolian Race.....	670,000,000
Total.....	1,554,000,000

POPULATION BY RELIGIONS.

Brahmins.....	177,000,000
Buddists and Confucians.....	450,000,000
Greek Church.....	82,000,000
Heathen and Fetish Worshipers.....	211,000,000
Jews.....	10,000,000
Mohammedans.....	210,000,000
Protestants.....	118,000,000
Roman Catholics.....	190,000,000
Unclassified.....	106,000,000
Total.....	1,554,000,000

POPULATIONS AND AREAS OF COUNTRIES.

	Populations.	Area in Sq. miles.
Abyssinia.....	7,360,000	244,000
Aden.....	34,711	79
Afghanistan*.....	4,000,000	
Algeria.....	3,817,306	184,465
Alsace-Lorraine.....	1,564,355	5,568
Andorra.....	6,000	175
Annam.....	21,000,000	200,000
Arabia.....	5,000,000	1,219,600
Argentine Republic.....	4,200,000	1,124,086
Ascension Island.....	240	35
Assiniboia, Albert, and Saskatchewan.....	61,487	
Austria-Hungary.....	41,665,277	261,649
Bazgharm.....	1,600,000	71,000
Bahamas.....	45,521	4,406
Baluchistan.....	500,000	11,100
Barbados.....	180,000	166
Bassutoland.....	200,000	9,720

*Area not determined because of uncertain boundaries—extreme breadth north and south, 500 miles; length 600 miles.

POPULATION AND AREAS OF COUNTRIES.

	Population.	Area in Sq. Miles.
Beechuanaland.....	44,135	170,000
Belgium.....	6,080,043	11,373
Bermudas.....	15,334	20
Bolivia.....	2,191,891	770,000
Bismark Archipelago.....	190,000	19,000
Borneo, North.....	175,000	31,106
Bornu.....	5,000,000	50,000
Brazil.....	14,002,335	3,218,032
British Columbia.....	25,707	341,805
British Guiana.....	216,066	109,000
Bulgaria (including South Bulgaria or Eastern Roumelia).....	3,154,000	38,526
Canada, including 140,000 square miles of water area.....	4,823,344	3,610,257
Cape of Good Hope.....	1,222,000	213,536
Caroline Islands and Palos.....	36,000	860
Ceylon.....	2,850,000	25,365
Chili.....	2,665,926	293,970
China.....	404,180,000	4,179,559
Cochin-China.....	1,858,807	23,082
Colombia.....	4,500,000	613,533
Corea*.....	10,528,937	82,000
Costa Rica.....	203,780	23,000
Cuba.....	1,528,684	43,220
Curacao and connections.....	49,461	433
Cyprus.....	186,173	3,584
Denmark.....	2,185,159	14,124
Dominica, see Leeward Islands		
Eastern Roumelia, or South Bulgaria.....	960,441	13,500
Ecuador.....	1,230,000	248,370
Egypt.....	6,806,381	494,000
Falkland Islands.....	1,890	8,070
Fiji.....	124,919	7,740
France.....	38,218,903	904,177
Gambia.....	50,000	2,700
Germany.....	46,855,704	211,168
Gibraltar.....	23,991	19-10
Gold Coast.....	1,905,000	15,000
Great Britain and Ireland.....	35,241,483	121,481
Greece.....	2,218,908	25,041
Grenada.....	50,393	120
Guatemala.....	1,460,017	46,800
Guiana, British.....	282,066	109,000
Guiana, Dutch.....	69,329	45,000
Guiana, French.....	25,600	27,560
Hayti.....	672,000	10,204
Hawaii.....	80,578	6,640
Holigoland.....	2,000	3
Honduras, Republic of.....	431,917	46,400
Honduras, British.....	27,462	7,562
Hong Kong.....	194,482	29
Hungary.....	17,180,971	125,089
Iceland.....	72,445	39,756
India.....	273,533,000	1,648,944
Ireland.....	5,174,836	32,583
Italy.....	28,459,628	110,620
Jamaica, including Turks and Cal- icos Islands.....	632,887	4,494
Java, including Madura.....	22,440,941	51,901
Kanien.....	100,000	30,000
Kaiser Wilhelm's Land.....	109,000	70,300
Kurdistan.....	3,000,000	500,000
Labrador.....	4,211	56,000
* See Newfoundland		
Labuan.....	6,015	30½
Lagos, (including Touruba).....	8,000,000	20,070
Leeward Islands.....	128,646	701
Liberia.....	1,068,000	14,300
Marshall Islands.....	10,000	150
Madagascar.....	3,500,000	228,500
Malta.....	168,850	95
Manitoba.....	154,442	60,520
Mauritius, including its dependen- cies, Rodrigues, Diego Garcia and Seychelles Islands.....	572,664	705
Of dependencies.....		172
Mexico.....	10,540,974	751,177
Monaco.....	13,004	8
Montenegro (including annexations).....	236,000	3,630
Morocco.....	8,000,000	314,000
Mozambique and dependencies.....	2,000,000	200,000

POPULATION AND AREAS OF COUNTRIES.

	Population.	Area in Sq. Miles.
Natal.....	530,158	21,150
Nepaul.....	2,000,000	56,800
Netherlands.....	4,450,870	12,680
New Brunswick.....	331,394	27,174
Newfoundland.....	193,121	49,300
New Guinea, British.....	135,000	86,457
New Guinea, Dutch.....		
New Guinea, German—see Kaiser Wilhelm's Land.....		
New South Wales.....	1,129,000	310,700
New Zealand.....	662,248	104,072
Nicaragua.....	400,000	49,500
Niger District Protectorate.....	17,000,000	500,000
Norway.....	1,818,853	123,205
Nova Scotia.....	450,523	20,907
Oman.....	1,500,000	32,000
Ontario.....	2,132,689	181,800
Orange Free State.....	133,518	41,500
Papua—See New Guinea.		
Paraguay.....	329,645	91,970
Persia.....	7,653,600	628,000
Persia (exclusive of 350,000 uncivilized Indians).....	2,621,844	463,747
Philippine Islands.....	9,600,000	114,336
Pondoland (area included in Cape Colony).....	200,000	
Porto Rico.....	754,313	3,530
Portugal, including Islands.....	4,708,178	34,038
Prince Edward Island.....	199,468	2,133
Prussia.....	28,318,470	196,075
Quebec.....	1,488,586	188,688
Queensland.....	406,658	668,497
Romania.....	5,569,000	48,307
Russian Empire.....	113,354,649	8,660,282
St. Helena.....	5,005	47
Salvador.....	651,130	7,225
Samoa.....	36,000	1,701
Sandwich Islands.—See Hawaii		
St. Lucia.....	45,000	245
St. Vincent.....	47,741	122
San Domingo.....	610,000	18,045
Serbia.....	2,096,043	19,050
Siam about.....	6,000,000	250,000
Sierra Leone, including Sherbo and adjoining territory.....	180,000	15,000
S. L. proper.....	75,000	300
Socotra.....	4,000	3,000
Solomon Islands, German posses- sions.....	80,000	9,000
South African Republic, or The Trans- vaal.....	610,000	121,854
South Australia.....	324,484	903,690
Spain.....	17,550,246	197,670
Spanish Possessions.....	12,123,743	406,903
Straits Settlements.....	568,000	1,472½
Sudan States.....		
Sumatra, Islands of..... 2,000,000 to	3,000,000	177,000
Surlham.....	57,365	46,060
Sweden.....	4,774,409	170,979
Switzerland.....	2,933,324	15,892
Tasmania.....	151,480	26,215
Tonga.....	21,000	374
Tonquin—Population and area ex- tremely uncertain.....		
Trinidad and Tabago.....	216,798	1,678
Tripoli.....	1,010,000	394,000
Tunis.....	1,500,000	44,920
Turkish Empire.....	33,359,787	1,652,742
United States, Unorganized Terri- tories of Canada and Arctic Islands.....	32,164	
Uruguay.....	651,015	72,110
Venezuela.....	2,269,385	632
Victoria.....	1,181,247	87,884
Wadal.....	2,600,000	172,000
Western Australia.....	29,708	975,920
West Indies—See Bahamas, Barba- doe, Jamaica, Leeward Islands, Trinidad and Windward Islands.	143,084	487
Zanzibar and Pemba (40,000 Zanzibar 625 and Pemba 360 square miles)	165,000	985
Zululand including Tongoland.....	180,000	14,220

+From Statesmen's Year Book. An intelligent American gentleman, long a resident of Corea, estimates the population in 1891 at 15,000,000.

POPULATIONS, AS AFFECTED BY BIRTH AND DEATH RATES.—The progress of population is affected by birth-rates in various countries but less so than by the death-rates in those countries. Most European countries have a higher birth-rate than Great Britain but her average increase is much greater than theirs. The following table will show this fact. At this writing complete statistics cannot be given for comparison later than those of 1880:

After destructive wars there is a great excess of male births, as occurred in France after 1815, and still more notably in Paraguay, since the exterminating war of 1865-1870, male births in the latter country being eight times as numerous as the females, as if nature sought to restore the balance of the sexes. In the northern Hemisphere the largest number of births occur in February, in the southern, in July. The ratio of still-born infants is $4\frac{1}{2}$ per cent., being always greater in towns than in rural districts, and less among Jews than Christians. Male still-births are 40 per cent. more numerous than female. The proportion of illegitimate births has declined one third in Great Britain and some other countries since 1840, but it has risen in France and Sweden. Twins are most numerous in

Sweden and Bavaria, say, fourteen per 100; these countries also rank highest for illegitimacy.

Countries.	No. Per Annum.	Excess over Deaths.	No. Per 1000 Inhabitants.	
			1860-70.	1870-80.
Austria.....	1,486,000	324,000	...	89.9
Australia.....	109,000	66,000	39.0	86.0
Belgium.....	172,000	48,600	31.2	32.2
Canada.....	140,000	60,000	...	...
Denmark.....	62,500	24,000	...	31.2
England.....	880,520	822,400	...	...
Ireland.....	128,010	25,055	33.4	34.3
Scotland.....	124,652	48,850	...	...
France.....	936,000	97,000	26.5	25.6
Germany.....	1,036,000	592,000	...	39.8
Greece.....	72,000	17,000	...	...
Holland.....	144,000	49,000	34.6	36.2
Italy.....	1,064,000	228,000	37.5	46.9
Norway.....	58,000	29,000	...	...
Portugal.....	150,000	30,000	...	...
Russia.....	3,116,000	779,000	...	...
Spain.....	592,000	115,000	...	37.2
Sweden.....	139,000	62,000	32.1	30.3
Switzerland.....	86,000	20,500	...	...
United States.....	2,100,000	1,343,000	...	...

POPULATION OF PRINCIPAL CITIES OF THE GLOBE,

IN VARIOUS COUNTRIES WHICH, AT DATES MENTIONED, REPORTED SEVERALLY A POPULATION OF 50,000 OR OVER.

AFRICA.			India.			Rawalpindi.....1881		
Cairo.....1882	368,108	Janetschau.....Est.	360,000	Bombay.....1881	773,196	Patna.....	52,119	52,975
Alexandria.....1882	208,755	Lein-kong.....	278,000	Calcutta.....	684,658	Hydrabad.....	53,629	51,670
Abokuta.....Est.	130,000	Taijuen-fu.....	250,000	Cydera.....	354,692	Chupra.....	51,670	50,667
Tunis.....	125,000	Veiheln.....	235,000	Madras.....	405,848	Salem.....	50,987	50,098
Porto Novo.....	100,000	Tientsin-fu.....	235,000	Lucknow.....	261,303	Coimbatore.....	50,098	54,746
Fez.....	100,000	Hutschau.....	200,000	Benares.....	199,700	Tanjore.....	50,098	54,746
Zanzibar.....	80,000	Jouping.....	200,000	Delhi.....	173,393			
Bida.....	80,000	Tschangjakheu.....	200,000	Patna.....	170,354			
Antananarivo.....	75,000	Tschaujing.....	200,000	Agra.....	160,000			
Ojo.....	70,000	Tsinan-fu.....	200,000	Umrutau.....	151,897			
Kumasi.....	70,000	Mukden.....	200,000	Bangalore.....	155,857	Manilla.....Est.	160,000	160,000
Illori.....	70,000	Urumtsi.....	150,000	Cawnpore.....	151,444	Batavia.....1875	99,109	99,109
Port Louis.....	65,000	Tsching-kiang.....	140,000	Lahore.....	149,349	Surakarta.....Est.	90,000	90,000
Kula.....	60,000	Hwanguen.....	120,000	Allahabad.....	148,547	Samarang.....	50,000	50,000
Lagos.....	60,000	Kirin.....	120,000	Jeypure.....	142,578	Sarabaja.....	50,000	50,000
Abome.....	60,000	Ningpo.....	120,000	Rangoon.....	134,176			
Khartoum.....	60,000	Tschifu-fu.....	120,000	Poona.....	129,751			
El-Beid.....	50,000	Pauting-fu.....	120,000	Ahmedabad.....	127,621	Tokio.....1888	1,318,299	1,318,299
Ibadan.....	50,000	Tungku-fu.....	120,000	Surat.....	113,417	Osaka.....	442,658	442,658
Jacoba.....	50,000	Victoria.....	120,000	Bareilly.....	109,844	Kioto.....	267,780	267,780
Kabebe.....	50,000	Hangjau.....	100,000	Howra.....	105,206	Nagoya.....	154,981	154,981
Morocco.....	50,000	Hutschau-fu.....	100,000	Baroda.....	101,818	Hakodate.....	52,693	52,693
Oghomoscho.....	50,000	Shaklung.....	100,000	Meerut.....	99,565	Kanagawa.....	96,752	96,752
Salaga.....	50,000	Tungtscho.....	100,000	Nangpore.....	98,299	Hiroshima.....	81,873	81,873
		Yuentichung.....	90,000	Ewalor.....	88,066	Yokohama.....	119,783	119,783
		Macao.....	85,000	Trichinopoly.....	84,849	Yakayama.....	55,097	55,097
		Han-tschung-fu.....	80,000	Peshawur.....	79,982	Sendai.....	77,517	77,517
		Jingste.....	80,000	Decca.....	79,076	Kobe.....	115,954	115,954
		Liaoyang.....	80,000	Gya.....	76,915	Tokushima.....	60,080	60,080
		Tschingting-fu.....	75,000	Jubbulpore.....	75,705	Toiyama.....	55,800	55,800
		Kwang-tschung-tse.....	70,000	Indore.....	75,401	Kumamoto.....	52,189	52,189
		Tsingtschau-fu.....	70,000	Sheikpappe.....	74,890	Fukoka.....	60,405	60,405
		Tungkwau.....	70,000	Rampur.....	74,250			
		Urga.....	70,000	Madura.....	73,807			
		Anhai.....	60,000	Kurrachee.....	73,560			
		Hyantschau.....	60,000	Mooltan.....	68,674	Teheran.....Est.	210,000	210,000
		Nutschung.....	60,000	Bhaugulpore.....	68,238	Tabris.....	120,000	120,000
		Pingyau-hei-fu.....	60,000	Umballa.....	67,465	Reschit.....	60,000	60,000
		Tamsui.....	60,000	Mogadishu.....	67,397	Mesched.....	60,000	60,000
		Taitisgar.....	60,000	Bhivrtipur.....	66,163	Isphan.....	60,000	60,000
		Yuyan.....	60,000	Durbungha.....	65,955			
		Z-kyu.....	60,000	Furruckabad.....	62,497			
		Swatow.....	55,000	Koil.....	61,730			
		Bangka.....	50,000	Sholapore.....	61,281			
		Kuking.....	50,000	Shrautapore.....	59,194			
		Tathau.....	50,000	Goruckpore.....	57,922			
		Wentschau.....	50,000	Calicut.....	57,085			
				Mirzapore.....	56,378			
				Bhopal.....	55,402			
				Fyzabad.....	55,370			
				Monghy.....	55,372			
				Bellary.....	53,465			
				Nagpur.....	53,385			
				Moulmein.....	53,107			

Turkestan.		Danzig.....	1886	108,551	Italy.		Saloniki.....	1885	60,000	
Yarkand.....Est.	80,000	Strasburg.....	"	104,471	Naples.....	1891	494,314	Adrianople.....	"	100,000
Buchara.....	70,000	Nuremberg.....	"	99,519	Haarlem.....	"	62,155	NORTH AMERICA.		
Kashgar.....	70,000	Munich.....	"	114,632	Gronningen.....	"	55,215	Dominion of Canada.		
Australia.		Düsseldorf.....	"	95,941	Milan.....	"	321,839	Montreal.....	1891	216,650
Melborne.....1889	445,220	Chemnitz.....	"	110,693	Rome.....	"	300,467	Toronto.....	"	181,200
Sydney.....	381,730	Eiberfeld.....	"	106,663	Turin.....	"	252,832	Quebec.....	"	68,090
New Castle.....	52,892	Stettin.....	"	91,756	Palermo.....	"	241,991	Mexico.		
Arundland.....	57,048	Altona.....	"	104,457	Genoa.....	"	179,515	Mexico.....	1888	350,000
Adelaide.....	125,000	Aachen.....	"	85,361	Florence.....	"	169,001	Guadalajara.....	"	92,875
EUROPE.		Brunswick.....	"	75,038	Venice.....	"	132,829	Puebla.....	"	78,530
Austria-Hungary.		Krefeld.....	"	73,572	Messina.....	"	126,497	Guajayasto.....	"	65,000
Vienna.....1888	1,350,000	Halle.....	"	75,355	Bologna.....	"	128,479	Xacatecas.....	"	62,000
Budapest.....	465,600	Dortmund.....	"	78,280	Catania.....	"	100,417	Merida.....	"	56,000
Prague.....	304,000	Posen.....	"	68,177	Livorno.....	"	97,615	United States.		
Trieste.....	160,000	Mühlhausen.....	"	63,629	Ferrara.....	"	75,513	New York, N. Y., 1890	1,513,501	
Lemberg.....1888	122,000	Augsburg.....	"	61,408	Padua.....	"	72,714	Philadelphia, Pa.,	1,044,804	
Gratz.....	106,000	Mayence.....	"	60,905	Verona.....	"	68,741	Brooklyn, N. Y.,	804,377	
Brinn.....	87,000	Kassel.....	"	62,950	Lucca.....	"	68,063	Chicago, Ill.,	1,098,576	
Szegedin.....	74,355	Essen.....	"	66,944	Allesandria.....	"	62,461	Boston, Mass.,	448,437	
Cracow.....	75,000	Manheim.....	"	63,465	Brescia.....	"	60,630	St. Louis, Mo.,	450,245	
Maria-Teresiop- olis.....	61,367	Frankfort (on Oder).....	"	63,131	Barl.....	"	60,575	Baltimore, Md.,	433,547	
Debreczin.....	52,513	Lubeck.....	"	51,147	Ravenna.....	"	60,573	Cincinnati, O.,	296,309	
Czerinowitz.....	53,000	Wiesbaden.....	"	51,055	Modena.....	"	58,008	San Francisco, Cal.,	297,990	
Hod-MezoVasar- hely.....	50,956	Grlitz.....	"	50,238	Perugia.....	"	53,924	New Orleans, La.,	241,992	
Pressburg.....	50,786	Kiel.....	"	51,699	Beggio.....	"	50,651	Cleveland, O.,	261,546	
Belgium.		Great Britain and Ireland.			Portugal.		Pittsburg, Pa.,	238,478		
Antwerp.....1890	221,360	London.....1890	*4,421,661	Lisbon.....	1878	246,373	Buffalo, N. Y.,	254,457		
Brussels.....	477,398	Liverpool.....	"	Oporto.....	"	105,838	Washington, D. C.,	228,160		
Ghent.....	152,391	Glasgow.....	"	Roumania.			Newark, N. J.,	181,518		
Liège.....	146,162	Birmingham.....	"	Bucharest.....	1879	221,000	Louisville, Ky.,	161,005		
Mechlin.....	50,238	Manchester.....	"	Jassy.....	"	90,000	Jersey City, N. J.,	106,387		
Denmark.		Salford.....	"	Galatz.....	"	80,000	Detroit, Mich.,	205,669		
Copenhagen.....1890	375,251	Leeds.....	"	Russia.			Milwaukee, Wis.,	204,150		
France.		Sheffield.....	"	St. Petersburg.....	1890	1,008,315	Providence, R. I.,	132,099		
Paris.....1891	2,269,023	Dublin.....	"	Moscow.....	"	753,769	Albany, N. Y.,	98,522		
Lyons.....	376,515	Edinburgh.....	"	Warsaw.....	"	454,898	Rochester, N. Y.,	138,327		
Marseilles.....	360,099	Leith.....	"	Odessa.....	"	304,000	Allegheny, Pa.,	104,967		
Bordeaux.....	221,305	Belfast.....	"	Riga.....	1881	168,844	Indianapolis, Ind.,	107,465		
Lille.....	178,144	Cristol.....	"	Kiev.....	1887	170,216	Richmon, Va.,	80,838		
Toulouse.....	140,389	Nottingham.....	"	Saratow.....	1888	128,410	New Haven, Ct.,	85,981		
Nantes.....	124,319	Bradford.....1890	240,515	Karkow.....	1888	188,469	Lowell, Mass.,	77,696		
Saint Etienne.....	123,312	Hull.....	213,836	Blarkow.....	"	188,469	Worcester, Mass.,	84,655		
Rouen.....	105,949	Stoke-on-Trent.....	102,987	Kasan.....	"	132,205	Kansas City, Mo.,	132,416		
Havre.....	105,867	Newcastle.....	145,959	Nikolaiev.....	"	39,636	Troy, N. Y.,	60,405		
Rheims.....	93,823	Gateshead.....	65,803	Vienna.....	"	39,636	Cambridge, Mass.,	70,028		
Roubaix.....	91,757	Dundee.....	140,239	Tchernigov.....	"	68,025	Syracuse, N. Y.,	87,877		
Amiens.....	74,170	West Haven.....	128,692	Astrachan.....	"	57,704	Columbus, O.,	90,398		
Nancy.....	73,225	Porthsmouth.....	142,952	Berditchev.....	"	56,980	Pateron, N. J.,	78,356		
Toulon.....	70,102	Leicester.....	164,344	Orel.....	"	54,889	Toledo, O.,	82,652		
Brest.....	69,110	Sunderland.....	138,506	Jitomir.....	"	54,224	Atlanta, Ga.,	65,514		
Angers.....	68,049	Oldham.....	146,716	Simferopol.....	"	52,585	Charleston, S. C.,	54,592		
Nice.....	66,279	Brighton.....	123,659	Dunabourg.....	"	52,351	Dayton, O.,	58,668		
Limoges.....	65,765	Bolton.....	115,846	Samara.....	"	51,947	Denver, Col.,	126,185		
Nismes.....	63,652	Aberdeen.....	105,189	Reval.....	1881	50,859	Des Moines, Ia.,	50,062		
Rennes.....	60,974	Blackburn.....	123,553	Spain.			Evansville, Ind.,	50,674		
Orleans.....	57,264	Preston.....	105,103	Madrid.....	1887	472,228	Fall River, Mass.,	74,398		
Besancon.....	57,067	Norwich.....	95,352	Barcelona.....	"	272,481	G'd Rapids, Mich.,	64,147		
Montpellier.....	56,005	Birkenhead.....	105,149	Valencia.....	"	171,763	Hartford, Conn.,	53,182		
Dijon.....	55,543	Cardiff.....	117,012	Seville.....	"	143,182	Lincoln, Neb.,	56,491		
Le Mans.....	55,347	Huddersfield.....	94,253	Malaga.....	"	184,061	Los Angeles, Cal.,	50,394		
Tours.....	52,209	Derby.....	100,871	Murcia.....	"	98,538	Lynn, Mass.,	55,729		
Tourcoing.....	51,825	Cork.....	80,124	Saragossa.....	"	92,407	Memphis, Tenn.,	64,686		
Grenoble.....	51,371	Croydon.....	78,947	Granada.....	"	78,006	Minneapolis, Minn.,	16,788		
Versailles.....	48,324	Plymouth.....	78,780	Cartagena.....	"	84,171	Nashville, Tenn.,	76,302		
Germany.		Devenport.....	48,939	Cadiz.....	"	62,531	Omaha, Neb.,	129,526		
Berlin.....1885	1,316,332	Halifax.....	82,035	Palma.....	"	60,514	Reading, Pa.,	58,926		
Hamburg.....	289,859	Greenock.....	66,704	Valladolid.....	"	62,018	St. Joseph, Mo.,	52,611		
Breslau.....	298,893	Rochdale.....	69,866	Cordova.....	"	55,614	St. Paul, Minn.,	133,156		
Munich.....	230,033	Swansea.....	65,936	Lorca.....	"	51,708	Scranton, Pa.,	83,485		
Dresden.....	245,550	Southampton.....	60,051	Bilbao.....	"	50,772	Syracuse, N. Y.,	87,871		
Leipzig.....	170,076	Stockport.....	59,553	Sweden and Norway.			Trenton, N. J.,	58,483		
Köln.....	149,009	Walsall.....	58,795	Stockholm.....	1889	243,500	Wilmington, Del.,	61,439		
Cologne.....	144,722	Burnley.....	58,751	Christiana.....	1886	130,027	Portland, Ore.,	69,267		
Frankfurt.....	153,765	St. Helens.....	57,403	Gothenburg.....	1889	102,782	SOUTH AMERICA.			
Hanover.....	137,912	Southfields.....	56,875	Switzerland.			Rio de Janeiro.....	1885	357,332	
Stuttgart.....	125,001	Bromwich.....	56,239	Zürich.....	1888	90,008	Bueno Ayres.....	1890	336,160	
Bremen.....	102,921	Middlesbrough.....	55,394	Geneva.....	"	71,807	Bahia.....	1884	140,000	
Netherlands.		Paisley.....	55,638	Basel.....	"	69,809	Pemambuco.....	"	130,000	
Amsterdam.....1890	406,316	Ystradyfodwg.....	55,617	Turkey.			Cardoba.....	1887	66,600	
Rotterdam.....	203,472	Aston Manor.....	53,944	Constantinople.....	1885	873,565	Rosario.....	"	55,000	
The Hague.....	156,497	Bury.....	52,213	Switzerland.			La Plata.....	"	60,000	
Utrecht.....	86,353	Northampton.....	51,811	Zürich.....	1888	90,008	Sancti Spiritus.....	1885	200,000	
* Registration District.		Ipwich.....	50,546	Geneva.....	"	71,807	Valparaiso.....	"	105,000	
* Registration District.		Netherlands.			Basel.....	69,809	Lima.....	1876	101,488	
* Registration District.		Amsterdam.....1890	406,316	Turkey.			Montevideo.....	1887	134,340	
* Registration District.		Rotterdam.....	203,472	Constantinople.....	1885	873,565	Quito.....	"	50,000	
* Registration District.		The Hague.....	156,497	Switzerland.			La Paz.....	1890	56,849	
* Registration District.		Utrecht.....	86,353	Zürich.....	1888	90,008	Bogota.....Est.	50,000		
* Registration District.		Netherlands.			Basel.....	69,809	Caracas.....	1888	70,463	

POPULATION AS AFFECTED BY DEATH-RATES.—The comparative average death rates per 1,000 inhabitants in various countries, as tabulated by Mulhall from the official reports of those countries for twenty years, closing with 1880, were as follows:

	1861-70.	1071-80.	Twenty Years.
England.....	22'6	21'3	21.9
Scotland.....	22'1	21'3	21.9
Ireland.....	16'8	18'3	17.5
United Kingdom.....	21'4	21'0	21.2
France.....	22'9	24'3	23'6
Germany.....	27'1	27'1	27'1
Austria proper.....	30'4	31'2	30'8
Hungary.....	38'7	40'1	38'9
Italy.....	30'1	29'7	29'9
Spain.....	29'7	29'7	29'7
Belgium.....	22'8	22'6	22'7
Holland.....	24'9	24'3	24'6
Denmark.....	20'1	19'3	19'7
Sweden.....	20'0	18'4	19'2
Switzerland.....	24'0	24'0	24'0

Where the same rate is quoted above in both decades it means that the rate previous to 1870 is only an estimate.

PORCHER, FRANCIS PEYRE, an American physician and author, born in South Carolina in 1825. He graduated at Columbia and at Charleston; assisted in the production of the "Medical Journal and Review;" and is the author of works on therapeutic microscopy and of *Resources of the Southern Fields and Forests, Medical, Economical, and Agricultural*.

PORK. See SWINE in Britannica, Vol. XXII, pp. 772-776, and also in these Revisions and Additions.

PORPHYRIUS, one of that series of ancient philosophers to whom is due the reformation of the Greek philosophy known as Neo-Platonism, probably born at Batanea in Syria (the Bashan of Scripture) A. D. 233. His original name was Malchus, the Greek form of the Syro-Phœnician *Melech*, or king. The name by which he is known in history, *Porphyrius*, "one clad in purple," is but a Greek epithet intended as a sort of paraphrase of his name. He is said by Socrates, the historian, and by St. Augustine, to have been originally a Christian, but this seems improbable. It was at Rome that he entered upon what must be regarded as, historically considered, the career of his life. Here he became a scholar of Neo-Platonist Plotinus, with whom he entered into an animated controversy, but eventually adopted so fully the opinions of Plotinus, that he became himself, if not the leader of the school, at least the most trusted of the disciples of its master. After six years' residence in Rome he went to Sicily, where he wrote his once celebrated treatise in fifteen books against the Christians. Porphyrius was a very voluminous writer. Of his works, the titles of more than sixty are preserved, forty-three of which are entirely lost.

PORTAGE, a city, the county-seat of Columbia county, Wis., on the Wisconsin River and on Fox River, thirty miles north of Madison. It is an important manufacturing town and center of trade. Population in 1890, 5,130.

PORTAGE DES SIOUX, a village of Missouri, on the Mississippi, thirty miles above St. Louis.

PORT BYRON, a village of New York, ten miles north of Auburn. It contains an academy and manufactories of paper and barrels.

PORT CARBON, a borough of Pennsylvania, on the Schuylkill, four miles northeast of Pottsville. It is engaged in coal-mining and in the manufacture of iron.

PORT CHESTER, a village of New York, on Long Island Sound, twenty-five miles northeast of New York. It contains an academy and several foundries, factories and mills. Population in 1890, 5,538.

PORT CLINTON, a village, the county-seat of Ottawa county, Ohio, at the mouth of Portage River, on Lake Erie, fourteen miles west of Sandusky. It has a good harbor and contains several mills.

PORT CLINTON, a borough of Pennsylvania, on the Schuylkill and Little Schuylkill rivers, twenty miles north of Reading, is a center of manufacture and local trade.

PORT DEPOSIT, a village of Maryland, near the mouth of the Susquehanna, forty miles east of Baltimore. It is an important lumber-shipping and granite-quarrying place.

PORTE, SUBLIME PORTE, or OTTOMAN PORTE the name given to the Turkish government. The origin of this name is to be referred to the ancient Oriental custom of making the gates of cities and of king's palaces places of assembly in connection with the affairs of government and of the administration of justice.

PORTER, ANDREW, a Revolutionary soldier, born in Pennsylvania in 1743, died in 1813. He rendered good service throughout the war; rose to the rank of major-general of State militia; and became surveyor-general of the State in 1809. Of three sons who occupied high political positions, DAVID RITTENHOUSE PORTER (1788-1867), was governor of Pennsylvania (1839-1845); GEORGE BRYAN PORTER (1791-1834) was governor of Michigan; and JAMES MADISON PORTER (1798-1862), was a distinguished jurist. HORACE PORTER, son of David R., born in 1837. He graduated at West Point; was an efficient chief of ordnance in the civil war; was on General Grant's staff, and was military secretary to President Grant; is interested in railroad operations, and is manager of the Pullman Palace Car Company.

PORTER, DAVID, a distinguished commodore of the United States Navy, known in history as the gallant commander of the 32-gun frigate *Essex*, born in Massachusetts in 1780, died near Constantinople in 1843. His grandfather and father, who were sea-captains, had both rendered valuable services to the Revolutionary cause. He entered the navy in 1798, and served with great distinction throughout his life. His son, Commodore WILLIAM DAVID PORTER (1809-1864), was distinguished as the builder and commander of the iron-clad *Essex* and as the destroyer of the Confederate ram *Arkansas*, near Baton Rouge, in 1862. Another son, ADMIRAL DAVID DIXON PORTER (1813-1891) was in the Mexican navy during the Spanish-Mexican war; entered the United States Navy in 1829; served during the Mexican war; was widely known during the civil war as commander of the famous mortar fleet which acted against the Confederate strongholds on the Mississippi; became rear-admiral in 1862, vice-admiral in 1866 and admiral in 1870.

PORTER, FITZ-JOHN, an American military commander, a nephew of Commodore David Porter and cousin of Commodore William David and Admiral David Dixon Porter, born in New Hampshire in 1822. He graduated at West Point; served throughout the Mexican war, in which he was wounded; was instructor at West Point; became major-general of volunteers in 1862; was charged with having disobeyed orders, and cashiered in 1863; made numerous appeals for redress during many years; the sentence was partially remitted in 1882, and he was fully restored in 1886:

withdrew from the army; and was police commissioner in New York from 1884 to 1888.

PORTER, NOAH, an American metaphysician, president of Yale College, born in 1811, at Farmington, Conn., where his father was minister about sixty years. He succeeded President Woolsey of Yale in 1871, and resigned in 1886. Died 1892.

PORTER, PETER BUEL, a soldier of the war of 1812-14, born in Connecticut in 1773, died in 1844. He was distinguished for bravery in the operations in Western New York and across the Niagara River. He fought at Chippewa, and led the volunteers at Lundy's Lane and at Fort Erie; he was twice in Congress; and became Secretary of War in 1828. His grandson, PETER AUGUSTUS PORTER, was born at Black Rock in 1827; was a member of the New York legislature; colonel in the civil war; and was killed at Cold Harbor in 1864.

PORT EWEN, a village of New York, on the right bank of the Hudson, four miles below Kingston. It is an important point for the transshipment of coal.

PORT HENRY, a village of New York, on Lake Champlain, forty miles north of Whitehall. It has valuable iron-mines and several furnaces. Population in 1890, 2,436.

PORT HOPE, a town, the county-seat of Durham county, Ontario, and a port of entry, on Lake Ontario, sixty miles east of Toronto. It has a fine harbor, and is an important manufacturing town and center of trade. See Britannica, Vol. XIX. p. 528.

PORT HURON, a city, the county-seat of St. Clair county, Mich. Population in 1890, 13,519. See Britannica, Vol. XIX, p. 528.

PORT JEFFERSON, a village of New York, on Long Island and Long Island Sound, about sixty miles east of New York City. It is engaged in shipbuilding.

PORT JERVIS, a village of New York. Population in 1890, 9,327. See Britannica, Vol. XIX, p. 528.

PORTLAND, a village of Connecticut, on the Connecticut River, opposite Middletown. It is engaged in the quarrying of red sand-stone and in manufacturing.

PORTLAND, a village, the county-seat of Jay county, Ind., on Salamonie River, thirty miles northeast of Muncie.

PORTLAND, a city, the county-seat of Cumberland county, Me. Population in 1890, 36,608. See Britannica, Vol. XIX, p. 528.

PORTLAND, a village of Michigan, on the Grand River, about twenty-five miles west of Lansing. It has an abundant water-power and produces a variety of manufactures, including sash, blinds and woolen goods.

PORTLAND, a city, the county-seat of Multnomah county, Oregon. Population in 1890, 47,294. See Britannica, Vol. XIX, p. 529.

PORTLAND, a town of New Brunswick, adjoining St. John. It contains several foundries, saw-mills, and ship-yards. Plumbago and sulphate of barytes are found in the vicinity.

PORT ORCHARD, located on Puget Sound, and the place selected by a Congressional Commission for the construction of a dry dock. The selection was approved by President Harrison, Dec. 23, 1890. As a strategic point in time of war the commission holds that Puget Sound is an important place and one that can be easily defended. Regarding the feasibility of Port Orchard for a dry dock, the report states that it has a depth of fourteen fathoms of water, and is in other respects the most desirable place for a dry dock on the Pacific. The commissioners estimate that the land required for the

dock (about 307 acres) could be purchased for \$37,000.

PORTREEVE, the principal magistrate in a maritime town. This was the early name of the officer afterwards called mayor in London and elsewhere.

PORT RICHMOND, a village of New York, on the north shore of Staten Island, about nine miles from New York. It contains important manufactories of white lead, linseed oil, and brick.

PORTSMOUTH, a city, the county-seat of Rockingham county, N. H. Population in 1890, 9,827. See Britannica, Vol. XIX., p. 535.

PORTSMOUTH, a city, the county-seat of Scioto county, Ohio. Population in 1890, 12,387. See Britannica, Vol. XIX., p. 535.

PORTSMOUTH, a city of Virginia, on the Elizabeth River, about a mile southwest of Norfolk. Population in 1890, 12,345. See Britannica, Vol. XIX., p. 535.

PORTUGAL, KINGDOM OF. For general article on PORTUGAL, see Britannica, Vol. XIX., pp. 536-558. The latest published official estimates of the area and population are those of 1881, as follows, by provinces and districts.

Provinces and Districts.	Area in sq. miles.	Population 1881.
Entre Minhe-Douro:—		
Vianna do Castelo.....	867	211,539
Braga.....	1,056	836,248
Porto.....	882	466,981
Tras-os-Montes:—		
Villa Real.....	2,807	1,014,768
Braganza.....	1,718	225,090
	675	171,686
Beira:—		
Aveiro.....	2,293	396,676
Vizeu.....	1,124	270,266
Viseu.....	1,920	387,208
Coimbra.....	1,500	307,426
Guarda.....	2,146	234,368
Castello Branco.....	2,558	178,164
Estremadura:—		
Lisboa.....	9,248	1,377,432
Lisboa.....	1,843	199,645
Santarem.....	2,651	227,943
Lisbon.....	2,882	518,884
Alentejo:—		
Portalegre.....	6,876	946,473
Evora.....	2,484	105,247
Beja.....	2,738	112,735
	4,209	149,187
Algarve (Faro).....	9,431	367,169
	1,873	204,037
Total Continent.....	82,628	4,306,554
Islands:—		
Azores.....	1,005	269,401
Madeira (Funchal).....	505	182,223
Total Islands.....	1,510	401,624
Grand total population.....	84,038	4,708,178

REIGNING KING AND ROYAL FAMILY.—Carlos I., born Sept. 28, 1863, son of King Luis I. and his Queen Pia, daughter of the late King Vittorio Emanuele of Italy, who still survives; married May 22, 1886, Marie Amalie, daughter of Philippe Duc d'Orléans, Comte de Paris; succeeded to the throne Oct. 19, 1889.

Children of the King.—1. Louis Philippe, Duke of Braganza, born March 21, 1886. 2. Manuel, born Nov. 15, 1889.

Brother of the King.—Prince Afonso, Duke of Oporto, born July 31, 1865.

Aunt and Uncle of the King.—I. Princess Antonia, born Feb. 17, 1845; married Sept. 12, 1861, to Prince Leopold of Hohenzollern-Sigmaringen, born Sept.

22, 1835. Offspring of the union are three sons:—1. Prince Wilhelm, born March 7, 1864. 2. Prince Ferdinand, born Aug. 24, 1865. 3. Prince Karl, born Sept. 1, 1868. II. Prince Augustus, Duke of Coimbra, born Nov. 4, 1847.

Carlos I. has a civil list of 365,000 milreis*; while his consort has a grant of 60,000 milreis. The whole grants to the royal family amount to 571,000 milreis.

For two centuries the members of the line of Braganza kept up the ancient blood alliances with the reigning house of Spain; but the custom was broken through by the late Queen Maria II., who, by a union with a Prince of Coburg, entered the great family of Teutonic sovereigns. Carlos I. is the third sovereign of Portugal of the line of Braganza-Coburg (see Britannica).

CONSTITUTION AND GOVERNMENT.—The crown is hereditary in the female as well as male line; but with preference of the male in case of equal birth-right. The constitution recognizes four powers in the state, the legislative, the executive, the judicial, and the "moderating" authority, the last of which is vested in the sovereign. There are two chambers, the "Camara dos Pares," or House of peers, and the "Camara dos Deputados," or house of commons, which are conjunctively called the cortes. The law of July 24, 1885, abolishes hereditary peerages, though only by a very gradual process. The number of life peers appointed by the king will be 100, not including princes of the royal blood and the 12 bishops of the continental dioceses. Until such time as the life peers are reduced to 100 in number, the king can only appoint 1 peer for every 3 vacancies that take place. Peers living at the time when the law was passed, and their immediate successors, will continue to enjoy the right of sitting in the chamber of peers. There will be 50 elective peers, who must be chosen from one of the classes from which the king, under the law of May 3, 1878, may select life peers. They must possess certain property qualifications, and be over 35 years of age. Five of these peers mentioned above are to be chosen indirectly by the University of Coimbra and certain other Portuguese scientific bodies. The delegates to meet at Lisbon. The remaining 45 peers will likewise be chosen indirectly by the different administrative districts. The delegates for Lisbon will return 4 peers; those for Oporto, 3; those for the other districts, 2 each. The members of the second chamber are chosen in direct election, by all citizens twenty-one years of age who can read or write possessing a clear annual income of 100 milreis, and by heads of families; electors must register themselves. The deputies must have an income of at least 390 milreis per annum; but lawyers, professors, physicians, or the graduates of any of the learned professions, need no property qualification. Continental Portugal is divided into ninety-four electoral districts, which with Madeira and the Azores, return 140 deputies, or 1 deputy to 30,540 people. Each deputy has a remuneration of about 2½ milreis a day during the session. The annual session lasts three months, and fresh elections must take place at the end of every four years. In case of dissolution a new parliament must be called together immediately. The general cortes meet and separate at specified periods, without the intervention of the sovereign, and the latter has no veto on a law passed twice by both houses.

The executive authority rests, under the sovereign, in a responsible cabinet, divided into seven

departments, in charge of the ministries. The sovereign is permitted, in important cases, to take the advice of a council of state, or privy council, consisting, when full, of thirteen ordinary and three extraordinary members nominated for life.

RECENT GOVERNMENT CONTROVERSIES. — During the year, 1890, grave differences arose between the Portuguese and British governments. On Jan. 12, certain diplomatic negotiations relating to the African disputes, which had been in progress for some months without result, were brought to a head by a British government dispatch embracing substantially an *ultimatum* to Portugal, insisting upon an immediate and unequivocal acceptance of the British demands. This *ultimatum* was accepted, but under protest, by the Portuguese government. By the people at Lisbon, and in other parts of the country indescribable animosity was displayed against England in consequence. The British consulate was stormed by mobs, and all the newspapers were filled with the bitterest denunciation of all things English. The cabinet bent before the storm, and resigned, to be succeeded by a new ministry with Senhor Serpa Pimental as premier and minister of foreign affairs. In March another subject of dispute arose in connection with the seizure of the Delago Bay Railway by the Portuguese authorities at Mozambique, £28,000 being ultimately paid (Aug. 8) as indemnity to the British government on this account. In April the complete failure was recorded of an attempt to float a Portuguese loan at Paris. In August a convention was concluded between Great Britain and Portugal respecting the delimitation of their territories in Africa, but was received with such determined hostility by the press and in parliament that another resignation of the ministry resulted (Sept. 17). The utmost difficulty was experienced in forming another government, but ultimately a coalition ministry was formed, with General D'Abreu-e-Souza, a progressist, as president and minister of war, the new cabinet appearing before the cortes on Oct. 15, when it was announced that the government would do all in its power to obtain such modifications in the convention as would enable the parliament to consent to its ratification. The Portuguese authorities at Quilimane (Nov.) seized the British ship *James Stevenson* when in ballast, ran her ashore, and imprisoned the crew, on the ground that when in Portuguese waters she did not stop when called on to have her papers examined. It was announced (9th) that Great Britain agreed to the *modus vivendi* suggested by Portugal during the consideration of a new treaty, by which it is arranged that neither she nor the South African Company will make any treaties of vassalage with any African chiefs in the territories which, by the convention of Aug. 20th, were acknowledged to be Portuguese territory; and that the treaty with Mutassa and others made since that date shall be annulled, Portugal agrees to open the Zambesi and Shiré to free navigation by all nations, and concedes transit facilities for passengers and postal service. Both governments entirely reverse all their rights to negotiate a later final treaty. The present arrangement is valid for six months.

A patriotic battalion of 200 men left Rio de Janeiro (11th) to defend the Portuguese colonies in Africa, but the Portuguese government did not know where to place them. An agreement which will form a *modus vivendi*, was signed on Nov. 14th in London by Lord Salisbury and the Portuguese minister, to the following effect:

"The undersigned, duly authorized to that effect by their respective governments, have agreed as follows: (1) The government of his Most Faithful Majesty the King of Portu-

* 4½ milreis equal £1 or \$5.

gel and the Algarves engages to decree at once the freedom of navigation of the Zambesi and of the Shiré. (2) The government of his Most Faithful Majesty the King of Portugal and the Algarves engages to permit and to facilitate transit over the waterways of the Zambesi, the Shiré and the Pungé, and also over the landways which supply means of communication where those rivers are not navigable. (3) The government of his Most Faithful Majesty the King of Portugal and the Algarves further agrees to facilitate communications between the Portuguese ports on the coast and the territories included in the sphere of action of Great Britain, especially as regards the establishment of postal and telegraphic communications, and as regards the transport service. (4) The government of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland and the government of his Most Faithful Majesty the King of Portugal and the Algarves engage to recognize the territorial limits indicated in the convention of Aug. 20, 1890, in so far that, from the date of the present agreement to the termination thereof, neither power will make treaties, accept protectorates, or exercise any act of sovereignty within the spheres of influence assigned to the other party by the said convention. But neither power will thereby be held to prejudice any question whatever which may arise as to the said territorial limits in the course of the ulterior negotiations. (5) The present agreement shall come into operation from the date of its signature, and shall remain in force for a period of six months. Done at London, the 14th day of November, 1890.—SALISBURY. LUÍZ DE SOUVERAL."

Such was the general status of the Anglo-Portuguese controversy at the close of this record.

MOVEMENT OF POPULATION.—The yearly emigration from Portugal to Africa, America and Oceania and the total to all countries from 1882 to 1888, inclusive, is shown by the following table:

Years.	Africa.	America.	Oceania.	Total.
1882	479	17,739		18,272
1883	436	17,550	956	19,226
1884	567	15,343	1,581	17,518
1885	858	11,853	424	15,004
1886	270	13,039	426	13,998
1887	422	15,808	292	16,223
1888	556	22,952	5	23,961

FINANCE. The budget estimates for the fiscal year ending in 1891 were: Total revenue, 40,962,694 milreis; total expenditures (ordinary) 42,861,117 milreis. In addition there arose an extraordinary expenditure of 2,506,500 milreis.

The national debt reached a total of 533,316,612 milreis. The quota of the funded debt to each inhabitant was about \$120.

DEFENSE. The fortified places of Portugal in 1891 were in state of decay. They were Elvas, Jerumenha, Campo Mayor, Marvão, Peniche, Non-sando, Almeida, and the forts of Lisbon; there are several naval harbors.

The army of the kingdom is formed partly by conscription and partly by voluntary enlistment. Its organization is based on the law of June 23,

1864, modified by subsequent laws in 1868, 1869, 1875, 1877, 1884, and 1885. All young men of twenty-one years of age, with certain exceptions, are obliged to serve. The effective is fixed annually, by the Cortes. By the law of 1884 the army consists of twenty-four regiments of infantry, twelve regiments of chasseurs, ten regiments of cavalry, three regiments of mounted artillery, one brigade of mounted artillery, one regiment and four companies of garrison artillery, and one regiment of engineers. The duration of service is twelve years, three with the active army, five in the first, and four in the second reserve. The strength of the army was in 1889, 33,294 men of all ranks, including municipal and reserve guards. There were 4,034 horses and mules. The war effective is about 150,000 men, 12,690 horses and mules, and 264 guns. There are maintained in the colonies 8,880 officers and men, besides native troops.

The navy in 1890, consisted of one ironclad (of seven guns); six covettes (42 guns); 24 gunboats (65 guns); two transports, and four torpedo boats. The navy was officered by two vice admirals, five rear-admirals; 41 captains; 35 lieutenant-captains, etc., etc., and a total of 3,600 men.

COMMERCE, SHIPPING AND INTERNAL COMMUNICATION. Imports in 1889, 47,981,438 milreis; exports, 32,955,776 milreis. The imports from the United States in 1888 amounted to 4,483,784 milreis, and the exports to the United States amounted to 553,606 milreis. Wine was the chief export.

The commercial navy of Portugal consisted, on January 1, 1890, of 457 vessels of 60,214 tons, including 57 steamers of 30,512 tons.

Including coasters and vessels calling at different ports, there entered the ports of Portugal, the Azores, and Madeira in 1889, 2,737 sailing vessels of 441,518 tons and 3,823 steamers of 4,610,340 tons; there cleared 2,903 sailing vessels of 435,639 tons, and 3,802 steamers of 4,381,488 tons. Of the 6,560 vessels of 5,051,888 tons which entered, 566 of 219,382 tons (53 coasters of 64,686 tons) were Portuguese; 2,488 of 2,836,140 tons British; 715 of 735,248 tons German; 589 of 527,137 tons French; and 1,074 of 180,898 tons Spanish.

The length of railways open for traffic in 1890 was 1,284 miles, 505 miles being state, and 779 miles being companies' lines. At the same time 393 kilometres were under construction. All the railways receive subventions from the state.

PORTVILLE, a village of New York, on the Allegheny River, seven miles northeast of Olean. It manufactures lumber and leather.

POST, THOMAS M., an American divine, and educator, born in Vermont in 1810, died in 1886. He was author of *The Skeptical Era in Modern History*.

POSTAL SERVICE OF THE UNITED STATES.

By act of Congress approved March 3, 1883, the rate of postage on first-class matter was reduced from 3 to 2 cents a half ounce, the tariff of money-order fees was considerably lowered, and the issue of postal notes was authorized.

By act of June 9, 1884, postage on transient newspapers was fixed at one cent for each four ounces.

By act of March 3, 1885, the unit of weight of first-class matter was increased—the rate of postage being fixed at two cents an ounce instead of a half ounce; the special-delivery system, herein-after described, was authorized; and the rate of postage on newspapers and periodicals was reduced to one cent a pound.

By act of June 29, 1886, the fee for money-orders of less than \$5 was reduced.

In August, 1886, the issue of stamped letter-sheet envelopes was begun, under authority of the act of March 3, 1879.

By act of Jan. 3, 1887, the free-delivery system was extended to places of 10,000 population, or \$10,000 of annual postal revenue.

By an act of March 3, 1887, authority was given for the issue of postal-notes by other than money-order offices.

By act of July 24, 1888, the rate of postage on seeds, plants, bulbs, roots, scions, and cuttings was reduced from one cent an ounce to one cent for two ounces.

The existing rates of postage are as follows:

On letters or written or sealed matter, two cents an ounce.

On postal cards, one cent each.

On newspapers and periodicals mailed by publishers and news-agents, one cent a pound.

On books, circulars, miscellaneous printed matter, and seeds, bulbs, plants, cuttings, roots and scions, one cent for each two ounces.

On all other matter, one cent an ounce.

All matter on official business of the Government enclosed in distinct envelopes or under labels, free.

Newspapers and periodicals sent out by publishers to actual subscribers residing in the county of publication, free.

All matter sent out by agricultural colleges and agricultural experiment stations on the subject of agriculture, free.

Letters to countries of the Postal Union, five cents a half ounce.

There are several branches of our postal service which deserve special description: (1) *The Money-Order System* was created by act of Congress approved May 17, 1864. It provides the public with the means of making small remittances of money by mail cheaply and safely. This is accomplished through the issue of orders by one postmaster upon another. These orders are issued upon written applications therefor, the purchaser of the order being required to deposit with his application the amount of money for which he desires the order to be made, in addition to the fee. After the order is delivered to the purchaser, he sends it to the payee. The latter obtains the amount called for in the order from the postmaster at the receiving office upon presentation of the order.

Money orders are limited by law to \$100, the fees for amounts up to that being as follows: For an order not exceeding \$5, five cents; over \$5 and not over \$10, eight cents; over \$10 and not over \$15,

ten cents; over \$15 and not over \$30, fifteen cents; over \$30 and not over \$50, twenty-five cents; over \$50 and not over \$60, thirty cents; over \$60 and not over \$70, thirty-five cents; over \$70 and not over \$80, forty cents; over \$80 and up to \$100, forty-five cents. The order is always upon a designated postmaster, and therefore can be paid by no other, and it is invalid if not presented within one year from its date.

The principal security in the money order lies in the leaving out of the order the name of the payee, and in the sending by the issuing to the paying postmaster of a secret letter of advice, giving the payee's name and all the other particulars of the order, which renders it almost impossible to make a mistake in payment. If an order be lost or invalidated by improper assignment or lapse of time, or otherwise, it may be duplicated; if it be paid to the wrong person, the Government is liable to the owner.

The report of the superintendent of the Money-order System for 1890 presents further evidence of the tendency shown in late years towards a decrease of the average amount of domestic money-orders, there being an increase of nearly a half a million in the number of orders issued, but a decrease of over \$700,000 in the amount of such orders. This is in consonance with the true theory of the system, which is to provide a means of remitting small sums without interfering with vested banking interests. The postal notes show an increase of a little less than 2 per cent. in number and of over a half of 1 per cent. in amount. In the aggregate the amount of issues of money-orders amounted to nearly \$140,000,000, the same being an increase of 3.68 per cent. over the previous year.

The international money-order business exhibits an increase of over 34,000 in the number of orders issued and of nearly a million dollars in the amount thereof; of nearly 7,000 in the number of orders paid and of over \$350,000 in the amount thereof. These figures show, in contradistinction to the domestic business, an increase in the average amount of remittances from the United States to foreign countries, and an increase likewise in the average amount of the remittances from foreign countries to the United States.

There seems to be no diminution of the steady flow toward foreign countries of the savings of new citizens who find in our own land remunerative fields of labor. As shown in the report in question, it was necessary to liquidate balances abroad by reason of the excess of orders drawn in this country over those drawn upon us to the amount of \$8,353,561.50.

The benefits of an interchange of money-orders with this country will be extended, by means of conventions, to the Republic of Chili and also to the Republic of Ecuador. These conventions await only the approval and ratification of the home governments before the business may be begun. Negotiations for a like purpose are in progress with the Republic of Salvador, Central America, and the British colonies of Trinidad and Tobago and of the Bahamas.

(2.) *The Registry System* was first authorized by act of Congress of March 3, 1855. It gives additional security to valuable matter in its passage through the mail. The means relied on for giving this se-

curity consists in the recording, or registering, of all matter presented for registration, the giving of receipts to the senders at the time of mailing, the receipting and careful handling of the matter by all persons through whose hands it passes throughout its journey, and the final acknowledging of having received it by the addressee. A letter registered may be traced from hand to hand until it gets to its destination, or, in case of loss or miscarriage, up to the official who is responsible for it. Registered matter is inclosed in large colored envelopes, termed "registered package envelopes." They may contain one or more letters to any one post office. The condition of these envelopes must be indicated by the indorsements of all who handle them. A bill of lading or "registry bill," accompanies these envelopes, which bill, after verification, is returned by the receiving postmaster to the sending postmaster. A great part of the separate handling of registered matter has lately been obviated by the use of "through pouches" between prominent post offices, the pouches being locked with the tell-tale locks, that can be opened only by the sending and receiving postmasters.

Vast amounts of money, bonds, and other valuables are transmitted by registered mail, as we may see from the following report of the postmaster-general for the fiscal year ending June 30, 1890. He says:

Safety of Mail Matter.—1,223,444 pieces of registered mail matter, valued at \$1,114,491, 44¢ were forwarded for the Post-office and Treasury Department. It is not practicable to state accurately the value of the remaining 13,723,637 pieces of registered matter transmitted for the public during the year, but such value may be to some extent estimated by taking as a basis of calculation the known or the supposed contents of the 1,951 pieces reported to have been rifled or lost. The aggregate amount of the inclosures for these 1,951 pieces is reported at \$24,116.57, an average value per piece of \$12.36.

Value of Registered Mail.—By computing the 13,723,637 pieces at this rate, the result is \$169,624, 15¢. This is without much doubt an underestimate. This sum added to that of the official values given above creates a total of \$1,284,115,599.39. The net loss amounted in all to \$14,411.86, or $\frac{11}{1000}$ of 1 per cent.

Value of Ordinary Mail.—As to the ordinary mail matter, it is just as difficult to determine its value because there are no declared values, and it is not the business of the officials to inquire what letters contain. It is interesting to know, however, that the average value of the money letters opened in the Dead Letter Office was \$1.65; of the letters containing postal notes, \$1.51; and of the letters containing negotiable paper, \$55.07. By taking into account all letters open in the Dead Letter Office, the average value per letter is found to be little more than 25 cents (25.2). It is estimated that three are carried in the mails 1,854,667,802 ordinary letters per annum, these figures being based upon the general count of mail matter made for one week in May last. At the rate of 25.2 cents per letter the value of the ordinary letter-mail of the United States for one year would be \$467,376, 28¢.10.

Percentage of Loss.—There has been no loss at all in the department proper. The total supposed losses of ordinary mail throughout the United States, as reported by the office of the Chief Post-Office Inspector, amounted to 51,745 pieces. Of these 20,900, or 40 per cent., were packages, the remaining 60 per cent. being letters. The total losses ascertained to be due to carelessness or depredation of postal employes number 23,985; 60 per

cent. of which would be 14,391. Assuming the average value to be 25.2 cents, the total ascertained loss of ordinary letters chargeable to the postal service would be \$3,626.53, or $\frac{77}{100000}$ of 1 per cent.; and it is a cause of sincere congratulation that the practical termination of the lottery business as conducted through the mails will in great measure remove from postal employes the temptation to steal letters.

(3) *The Free-Delivery System* was authorized by act of Congress, March 3, 1863. Its function is to deliver letters and other mail matter at the places designated in the addresses. This is done by carriers employed by the Government. The same carriers also collect mail matter from the street boxes, wherein the letters are deposited by the senders. The term "free-delivery" is not correct; for while no direct charge is made for delivering matter by the carriers, there is an indirect charge, made by doubling the local or drop rate of postage on letters at all free-delivery offices. Thus, at an office where carrier delivery is not made, the drop rate on letters is one cent an ounce or fraction thereof; at a free-delivery office the drop rate is two cents—the difference being originally intended to maintain the system. Under the law passed by Congress affecting the free-delivery system, authority is given the postmaster-general to establish it at any place having a population of 10,000, or where the gross revenue of the post-office for the preceding year shall have amounted to \$10,000. The total number of free-delivery offices in existence on June 30, 1888, was 358. In 1889, 43 post-offices were enlarged to free-delivery offices, and in 1890 53 offices were made into free-delivery offices.

Village Free-Delivery.—Congress, by joint-resolution late in the session of 1890, gave authority to the Postmaster-General to use \$10,000 of the annual appropriation for the free-delivery for the purpose of ascertaining in a practical way the feasibility and cost of extending the free delivery to small towns and rural districts. Applications are now being received from various communities for the benefits of the free delivery. The experiment will be made in as many places as the appropriation will warrant. In villages one plan is to allow to the postmaster sufficient money to pay for the service of a man or boy for one or two hours per day, as the case may require. Those who prefer to go in person to the post-office may do so as hitherto, but those who cannot get a daily paper because they cannot go to the post-office every day for it, can have it delivered at their doors if they live, say, within a radius of two miles. In thinly settled rural districts it has been proposed to ask the school teachers to distribute the mails to pupils authorized by parents and neighbors to receive them.

(4) *The Special-Delivery System* was authorized by act of Congress of March 3, 1885. Its function is to deliver mail matter immediately to the addressee, when it arrives at a post-office. Special messengers are employed for this service. At first this system was confined to places having a population of 4,000 or more. But by a subsequent law it was extended to all post-offices. To secure special delivery the sender must affix to the letter, in addition to the postage, a large "special-delivery" stamp, which costs ten cents. Messengers are allowed eight cents for every special delivery. The government thus makes a profit of two cents on each letter. The amount of this profit is about \$30,000 a year. At large post-offices permanent messengers are employed on special-delivery duty. At other offices the postmaster effects delivery by any practicable means.

The following table gives the number of pieces of mail matter specially delivered since the introduction of the system at offices which are required to make returns:

Fiscal year (ending June 30).	Pieces ord. matter.	Pieces drop matter.	Total.
1886—Nine months only and at 555 offices.....	622,054	274,000	896,234
1887—At free-delivery offices	725,330	299,237	1,024,567
1888—At free-delivery offices	899,494	320,782	1,220,276

(5) *The Dead-Letter Office* has the function to restore to the owners letters and other mail matter that have failed of delivery. Everything is restored except printed matter of no apparent value or interest, such as advertisements, circulars, etc. If the matter bears upon it on the outside the name and address of the sender, it is returned to him direct by the receiving postmaster at the end of 30 days; if it bears a request to return within a given time, it is returned direct at the end of the time named. If it does not bear the name of the sender on the outside it is advertised, and, if not delivered, it is retained in the post-office for 30 days, and finally sent to the dead-letter office in Washington, where it is opened, if found necessary, and restored to the owner. Weekly returns of such matter are made by postmasters at the larger offices; monthly returns by all others. The registered matter is recorded and promptly restored to the senders. Matter of which the ownership cannot be ascertained, is held subject to reclamation. All foreign dead letters are returned without examination to the country of their origin. Much of the matter that reaches the dead-letter office is never restored, especially if neither the sender or addressee of the matter can be found, and if no inquiry concerning it is received, or if the writer of a letter has failed to sign his or her name, as it happens very frequently.

We insert here a few passages from the report of the postmaster-general for the fiscal year ending June 30, 1890, touching the *curiosities of the Dead-Letter Office*. He says:

Pains were taken to ascertain why so much mail matter continually comes to the Dead-Letter Office. The evidences are convincing that the miscarriage and non-receipt of such letters and parcels as reach that office are due in the main to the carelessness and omissions on the part of the public, and in very small measure only to any fault in the system or in the work of the employés.

Of the more than six million and a half of pieces of mail matter received annually at that office, nearly five millions and a half contained nothing of value, and it is almost inconceivable, but none the less true, that about one-half of this number contained no signature which would enable the Department to return them to the writers. They consist in the main of letters from one member of a family to another, or letters passing between intimate friends; and the signature may be, for example, "Mother," "Jack," "Your affectionate sister," or some equally indefinite appellation.

About 5½ per cent. of the whole number, or, in round numbers, 319,000, of all letters opened contained valuable inclosures, either of money, negotiable paper, postage-stamps, or miscellaneous papers and articles. The money inclosures alone amounted to over \$40,000 and those representing negotiable paper to over \$1,400,000. There were nearly 11,000 letters which contained lottery tickets, and nearly 200,000 contained pictures and papers of a character unfit for circulation. These were all destroyed.

Nearly 300,000 letters which contained inclosures were returned to the owners, and about three

and three quarters million pieces, on failure after every effort had been made to reach the owners, were destroyed. Parcels of merchandise unclaimed for two years are annually disposed of at auction. Last year there were offered nearly 39,000 such parcels, the proceeds amounting to \$2,766.53.

(6) *The Transportation of the Mails*, is done by 5 general methods, namely by railroads, by steamboats, by mail-messengers, by ocean steamers, and by what is known as "star" service. The pay for "railroad transportation" is prescribed by law of Congress. The companies are required to transport the mails on their fastest trains, and also to carry them to and fro between railroad stations and post-offices at their own expense, if the distance is not over ¼ mile. "Mail-messenger" service comprises the carrying of the mails between post-offices and railroad and steamboat stations where the distances are over ¼ mile; between one station and another of different railroads; between post-offices and their branches in large cities; and over routes not regularly established as post-routes. "steamboat" service is usually contracted for 4 years at the lowest obtainable rates; while "ocean steamship" service is let for periods of 2 years. The latter is confined to the foreign mails. The "star" service includes transportation by wagon, carriage, stage, horseback or afoot. The routes are designated by a star in the book of routes at the department. This service is let every 4 years to the lowest bidders. Competition has brought the pay over the star routes down to low rates, in some cases too low to secure good service.

In order to give an idea of the work performed by the Post-Office Department of the United States government we take the following table from the report of the Postmaster-General for the year 1890, being a statement of matter sent through the mails during the fiscal year ending June 30, 1890, as estimated upon the basis of an actual count at all the post-offices, for the seven days beginning at 6 o'clock A. M., on Monday, May 5, and ending at 6 o'clock A. M., on Monday, May 12, 1890.

Mail Matter.	No. of Pieces.	Weight.	Amount of Postage.
DOMESTIC FIRST-CLASS MATTER.			
1. Letters mailed to other post-offices (postage 2 cents an ounce or fraction thereof).....	1,561,452,742	Pounds, 37,872,584	\$82,516,626.63
2. Drop-letters for local delivery (postage 2 cents an ounce or fraction thereof).....	258,681,155	5,482,946	5,338,650.42
3. Wrapped parcels, sealed, mailed to other post-offices (postage 2 cents an ounce or fraction thereof).....	4,978,096	582,371	196,076.17
4. Wrapped parcels, sealed, for local delivery (postage 2 cents an ounce or fraction thereof).....	253,939	45,730	16,844.43
5. Drop-letters at 1 cent an ounce.....	34,533,905	820,335	847,385.51
6. Wrapped parcels for local delivery at 1 cent an ounce.....	534,828	61,679	12,539.28
7. Postal cards mailed to other post-offices.....	322,136,513	1,711,350	3,223,102.63
8. Postal cards deposited for local delivery.....	107,378,837	570,450	1,073,788.89
Total first-class matter.....	2,289,950,015	47,147,445	49,734,652.44

POSTAL SERVICE OF THE UNITED STATES 1265

Mail Matter.	No. of Pieces.	Weight.	Amount of Postage.
SECOND-CLASS MATTER (PREPAID).			
1. Mailed by publishers and news agents (postage 1 cent a pound).....	711,915,450	174,046,764	1,740,467.64
2. Newspapers, other than weeklies, and periodicals not exceeding two ounces in weight (postage, 1 cent for each copy).....	7,973,123	975,290	92,638.29
3. Periodicals weighing over two ounces (postage, 2 cents each).....	1,573,332	304,436	38,899.76
Total second-class matter.....	721,461,905	175,326,490	1,873,005.69
Transient newspapers and periodicals prepaid with postage stamps affixed (postage, 1 cent for each four ounces or fraction thereof).....	56,966,610	11,717,160	889,507.39
THIRD-CLASS MATTER.			
1. Mailed to other post-offices.....	416,187,099	40,388,611	5,792,418.05
2. Deposited for local delivery.....	60,787,576	3,223,270	669,434.48
Total third-class matter.....	476,974,675	43,611,881	6,461,852.53
SEEDS, SCIONS, BULBS, ROOTS, ETC.			
1. Mailed to other post-offices.....	4,565,531	2,410,836	222,310.89
2. Deposited for local delivery.....	117,293	17,964	3,041.61
Total seeds, scions, bulbs, roots, etc.....	4,782,824	2,428,800	225,352.50
FOURTH-CLASS MATTER.			
1. Mailed to other post-offices.....	35,472,934	11,027,136	1,868,013.89
2. Deposited for local delivery.....	2,016,766	461,709	93,453.64
Total fourth-class matter.....	37,489,700	11,488,845	1,961,467.53
MATTER TO FOREIGN COUNTRIES.			
1. Letters and sealed parcels.....	27,162,215	799,658	1,484,234.48
2. All other matter to foreign countries.....	14,111,097	3,151,113	334,908.76
Total foreign matter.....	41,273,312	3,950,771	1,819,143.24
Total paid matter....	3,628,899,041	295,671,392	55,954,981.32
FREE MATTER.			
1. Second-class matter mailed free in country of publication.....	307,141,350	7,160,223	.....
2. Letters inclosed in free-penalty envelopes.....	50,188,154	80,714,135	.....
3. Supplies, blanks, twine, etc., and all other matter mailed under free-penalty labels or penalty envelopes used as labels.....	7,587,821	27,543,016	.....
4. Franked matter, books, pamphlets, reports, seeds, etc., mailed free, under frank or otherwise, as provided by section 408 to 414 of the Postal Laws and Regulations of 1837.....	11,591,840	4,279,646	.....
Total free matter.....	376,509,165	69,637,025	.....
Total paid and free matter.....	4,005,408,206	365,368,417	55,954,982.32

Total amount of prepaid postages as shown in above table.....	\$55,954,981.32
Amount of due postages collected.....	\$280,059.04
Amount of special-delivery stamps mailed.....	176,952.80
Amount of registry fees on paid matter.....	1,216,416.90
Letter postage paid in money.....	108,725.41
Box rent.....	2,257,505.70
Fines and penalties.....	6,180.26
Dead letters.....	12,310.73
Miscellaneous.....	20,801.00
Money-order revenue.....	824,220.24
Total revenue.....	4,903,805.03
	60,558,783.40

ORGANIZATION.—The U. S. postal service is under the control of the Postmaster-General, who is, and has been since the Administration of President Jackson, a member of the Cabinet. Under him are the first, second, and third assistant postmasters-general, the superintendent of the money-order system, the general superintendent of the railway mail service, the superintendent of foreign mails, the chief post-office inspector, and the superintendent of the dead-letter office, each of whom has under him a corps of clerks and other employes at the seat of Government. Besides these there is an officer of the Treasury Department, known as the auditor of the Treasury for the Post-Office Department, who has a close and important connection with the postal service. The several classes of postal officials outside of the Department proper at Washington are postmasters and their clerks, letter-carriers, railway postal clerks, mail-messengers, and mail contractors. The first assistant postmaster-general has charge of the appointment and qualification of postmasters, the establishment of post-offices, the apportionment among them of the appropriations for clerk-hire, rent, light, and fuel, the supply of stationery, and the operations of the free-delivery system. The second assistant postmaster-general has control over the transportation of the mails, the making of contracts therefor, the ascertainment of the pay of railroads for mail service and the supply of mailbags, locks and keys. The duty of the third assistant postmaster-general takes in all business relating to the classification of mail matter and the rates of postage, the collection and deposit of the postal revenues, the payment of postal indebtedness, the control of the registry and special-delivery systems, and the issue to postmasters of postage-stamps, stamped envelopes, and other forms of stamped paper. The duty of the auditor is to audit and settle quarterly the accounts of postmasters and other postal officers, and to certify for payment the several classes of postal indebtedness. The duties of the other officers named are indicated by their designations.

THE NUMBER OF POST-OFFICES.—The number of post-offices of each class at the close of the fiscal year ending 30th of June, 1890, was:

Class.	1890.	1889.	1872.
First.....	102	97	.....
Second.....	517	497	1,200
Third.....	2,119	2,030	.....
Fourth.....	59,663	56,515	30,663
Total.....	62,401	58,999	31,863

The number of new offices established in 1890 was..... 4,236
The number of new offices established in 1889 was..... 2,776

The net increase in the number of offices, taking into account all the offices discontinued, was 3,905,

a considerably larger number than ever before in the history of the service, the next largest being immediately after the close of the war (1866), when the net increase was 3,278.

The number of offices enlarged to free-delivery offices in 1890 was.....	53
The number of offices enlarged to free-delivery offices in 1889 was.....	43
The number of substations and stamp agencies established in 1890 was.....	364
The number of substations and stamp agencies established in 1889 was.....	84

From 1860 to the close of the fiscal year lately ended—June 30, 1890—the progress of the postal establishment has been most marvelous. The number of post-offices has more than doubled, the aggregate now being 62,401; the total length of all the mail-routes in the country, not including letter-carrier routes in the cities, has increased to about 428,000 miles, and the gross postal revenue has grown to a little less than \$61,000,000, representing an increase over the revenue of 1860 of more than 600 per cent. The free-delivery service, which now, in 454 cities of the country and by means of more than 9,000 carriers, makes deliveries and collections of the mails, without extra tax, to the doors of the citizens, has been added. The great money-order system has been established, a system under which, at any one of 9,382 post-offices, remittances, in sums from one cent to a hundred dollars, may be made to every part of the world with absolute safety, and which is used so largely by the people to-day that the amount of its annual business in the issue and payment of orders is nearly \$156,000,000.

From a total business of a thousand letters a day, which is the estimate of the postmaster-general in 1789, letters and other pieces are now steadily dropping into the numberless receptacles of the postal system at the rate of nearly 800 a minute. This marvelous system employs more than 150,000 persons to-day.

POSTAL TRANSIT, RAPID. The New York "Evening Sun" of Sept. 2, 1891, wrote as follows: The steamship, Empress of Japan, left Yokohama on Aug. 19, carrying the usual mail for Europe. She reached Vancouver, B. C., on Aug. 29, which was very fast time. The authorities had a Canadian Pacific special train waiting to take the European mail and hurry it across the continent. There was about a car load of it. The New York Central was ready to take it up with another special train at Morristown, N. Y., and bring it to New York City in the quickest time possible.

The exact time of the Empress of Japan from Yokohama to Vancouver was ten days, fifteen hours, breaking the record for the Pacific by eight hours. From Vancouver to Brockville, 2,859 miles, the time was three days, ten hours. The schedule time for express trains is five days, eighteen hours.

The Canadian Pacific train reached Brockville at 9:40 P. M., transferring its load to the New York Central train at Morristown, N. Y. This train started at 9:45, and made the run of 353 miles to the Grand Central in New York, in six hours, fifty-eight minutes, arriving at 4:43 this morning. Between Utica and Albany this train ran ninety-five miles in ninety minutes.

The transfer of the mail from the Grand Central Depot over the New York pavements to the Inman steamship in twenty-seven minutes—for the City of New York sailed at 5:10 A. M., is, perhaps, a greater feat than anything done by the railroads. It was performed by assistant superintendent Bradley of the United States Railway Mail Service.

The City of New York was expected to connect at Liverpool with a train reaching Brindisi in

forty-eight hours. From Brindisi to Port Said the time is two and a half days. Sixteen hours takes you through the Suez Canal, and three days more to Aden. Aden to Colombo is five days; Colombo to Singapore, three days; Singapore to Hong Kong, three days; Hong Kong to Yokohama, four days.

The total time for the round-the-world trip, will thus be reduced to forty-four days.

This performance shows vividly the powerful energy displayed by the United States Postal authorities for the purpose of quickening the foreign mail service.

POSTAL UNION, UNIVERSAL. This is an association of States. The aim of this Union is to form, for purpose of international and mail communication, a single postal territory embracing the whole world, with uniformity of postal charges and conditions of international exchange for all descriptions of correspondence.

The International Postal Convention concluded at Berne, in October, 1874, went into operation on July 1, 1875. It began a new era in correspondence with the rest of the world. Nothing has contributed so much to a state of universal peace and amity, or to promote civilization and to disseminate truth and correct principles.

THE ORIGINAL MEMBERS.—The countries forming the Postal Union on June 30, 1876, were as follows: The United States, Austria-Hungary, Belgium, Denmark (including Iceland and the Faroe Islands), Egypt, France (including Algeria), Germany (including the Island of Heligoland), Great Britain and Ireland (including Gibraltar, Malta, and the dependencies of Malta), Greece, Italy, Luxemburg, Montenegro, Netherlands, Norway, Portugal (including the Island of Madeira and the Azores), Roumania, Russia (including the Grand Duchy of Finland), Servia, Spain (including the Balearic Isles, the Canary Islands, the Spanish possessions on the North Coast of Africa, and the postal establishments of Spain on the West Coast of Morocco), Sweden, Switzerland, and Turkey.

ADDITIONAL MEMBERS.—The following table shows the countries and colonies which, since June 30, 1876, have been added to the original Postal Union formed by the treaty concluded at Berne, Oct. 9, 1874, and the dates upon which the said countries and colonies adhered to the Union:

British India.....	July	1, 1876
French Colonies (except Bassam and Assinie).....	July	1, 1876
Bermuda, Islands of.....	April	1, 1877
Ceylon.....	April	1, 1877
Guiana, British.....	April	1, 1877
Hong Kong.....	April	1, 1877
Malacca.....	April	1, 1877
Labuan and Dependencies.....	April	1, 1877
Mauritius and Dependencies.....	April	1, 1877
Straits Settlements.....	April	1, 1877
Trinidad.....	April	1, 1877
Tunis, Italian postoffice at.....	April	1, 1877
Netherlands Colonies in Asia, Oceania, and America.....	May	1, 1877
Spanish Colonies in Africa, Asia, Oceania, and America.....	May	1, 1877
Tunis, French post-office at.....	May	1, 1877
Tangier, French post-office at.....	May	1, 1877
Japan.....	June	1, 1877
Portuguese Colonies.....	June	1, 1877
Brazil.....	July	1, 1877
Hong Kong post-offices at Canton, Swatow, Amoy, Foo Chow, Ningpo, Shanghai, and Hankow (China).....	Aug. 18, 1877	
Danish Colonies of St. Thomas, St. Croix, and St. Jean.....	Sept. 1, 1877	
Greenland.....	Sept. 1, 1877	
Persia.....	Sept. 1, 1877	
Shanghai, French post-office at.....	Oct. 1, 1877	
Cambodia, French post-office at.....	Jan. 1, 1878	
Tonquin, French post-office at.....	Jan. 1, 1878	
Argentine Republic.....	April 1, 1878	
Hong Kong postoffices at Hai-phung and Hanoi (Tonquin).....	April 23, 1878	
Canada.....	Aug. 1, 1878	

Sudan	Aug. 14, 1878
Cyprus, Island of	Dec. 20, 1878
British Colonies on the west coast of Africa	Jan. 1, 1879
Falkland Islands	Jan. 1, 1879
Honduras, British	Jan. 1, 1879
Newfoundland	Jan. 1, 1879
Andorra, Republic of	Jan. 1, 1879
Ionian Isles	April 1, 1879
Liberia	April 1, 1869
Lichtenstein, Principality of	April 1, 1879
Mexico	April 1, 1879
Monaco, Principality of	April 1, 1879
Nubia	April 1, 1879
Peru	April 1, 1879
San Marino, Republic of	April 1, 1879
Tripoli, Italian post-office at	April 1, 1879
Bulgaria	July 1, 1879
Leeward Islands (British)	July 1, 1879
Honduras, Republic of	Oct. 1, 1879
Venezuela	July 1, 1880
Bahama Islands	July 1, 1880
Ecuador	July 1, 1880
French Colonies of Grand Bassam and Assinie (dependencies of Gaboon)	July 1, 1880
Uruguay	July 1, 1880
Dominica, Republic of	Oct. 1, 1880
Chili, Republic of	April 1, 1881
Colombia, United States of	July 1, 1881
Hayti, Republic of	July 1, 1881
Paraguay, Republic of	July 1, 1881
Guatemala	Aug. 1, 1881

Almost all the countries and colonies of the world maintaining organized postal services are now embraced in the Universal Postal Union. The principal countries and colonies of postal and commercial importance not yet embraced in the Union are the Central and South American States of Nicaragua, Costa Rica, and Bolivia. The Sandwich Islands, New Zealand, and the British Colonies in Australia have recently taken preliminary measures for entering the Union at an early date, and it is confidently expected that all the other countries and colonies now outside the Union will adhere thereto, thus realizing the grand idea and aim of the founders of the Union.

On Feb. 4, 1885, a congress composed of members delegated by the States of the Postal Union met at Lisbon, Portugal, and adopted a new convention, which went into effect on April, 1, 1886 and which is now in force. Under the Postal Union an International Bureau is maintained at Berne, Switzerland, through which correspondence is carried on between the several countries of the Union relative to its common business, to the settlement of disagreements between two or more countries, to the tabulation and publication of statistics, and to all other matters that may be of interest or benefit to the postal world. The rates of international postage as now fixed by the convention are as follows: Letter, 5 cents a half ounce if prepaid, and double this rate (to be collected on delivery of the matter) if not prepaid. Postal cards, 2 cents each. Printed matter, commercial papers, and samples of merchandise, 1 cent for each two ounces if prepaid, and double this rate if not prepaid.

POSTURES, the name given to the attitude observed in worship, whether private or public, but especially the latter. Four postures are found to have been used by the ancient Christians in their prayer—the standing, the kneeling, the bowing or inclined, and the prostrate. Of these, the ordinary one was kneeling; but for it was substituted, during the Easter-time and on the Sundays, a standing posture, which was understood to symbolize the resurrection of our Lord. The question as to the use of particular postures was a subject of much controversy between the Puritans and the Church of England; and has recently been revived in the Presbyterian Church of Scotland.

POTASH. See *Britannica*, Vol. XIX, pp. 588-593. Ordinary commercial potash consists of the crude carbonate and hydrate of potash. It is chiefly obtained from wood ashes which contain it in abund-

ance. The method pursued in the United States is to burn large heaps of wood to ashes. These are then placed in tubs made from barrels sawn in half, and with perforated false bottoms. About 5 per cent. of lime is added, and the ashes are leached by successive applications of water, each of which is allowed to stand for an hour or two. The water is then drawn off from the bottom, the first draining being taken to the evaporating pans, while the succeeding portions are kept to use on fresh ashes. Broad, shallow iron pans are used in which the liquid is boiled till it becomes syrupy. It grows solid on cooling. The substance thus obtained is intensely alkaline. When purified by heat it becomes of a white, bluish, or pearly cast, and is known as pearlsh. The lime used in its preparation acts to decompose the sulphate of potash, which forms one of the salts of the ashes and frees the potash. Potash exists to the amount of 12 per cent. in the mineral glauconite of the greensand deposits of New Jersey. This is more easily decomposed than feldspar, and is capable of yielding large quantities of potash. The greater cheapness of soda has enabled it to replace potash in most cases where an alkali is needed, but a steady demand exists for potash from its special adaptation to certain uses. Its principal uses are in the manufacture of soft-soap and of several important salts of potassium. It is also used in the manufacture of glass; some of the best and most costly glasses now made, such as Bohemian white and English flint, being potash glasses.

POTATO. See *Britannica*, Vol. XIX, pp. 593-598.

POTATO BEETLE. See *INSECTS INJURIOUS TO VEGETATION*, in these Revisions and Additions; also in *Britannica*, Vol. VI, p. 134.

POT-METAL, an alloy of lead and copper, obtained by throwing lumps of copper into red-hot melted lead. It is of a gray color, brittle and granular.

POTOSI, a village of Wisconsin, on the Mississippi, fifteen miles above Dubuque. It is picturesquely situated in a narrow ravine, and is an important shipping-point for the products of the county.

POT-POURRI: in French, the name of a mixture of sweet scented materials, chiefly flowers, dried and usually placed in a vase with a perforated lid, in order that their perfume may be diffused through rooms in which it is placed. But it also signifies a dish of different sorts of viands, and corresponds, in this sense, to the *hotch-potch* of Scotland and the *Olla Podrida* of Spain.

POT-POURRI: in Music, a selection of favorite pieces strung together without much arrangement so as to form a sort of medley.

POTSDAM, a village of New York, on the Racket River, eleven miles east of Canton. It has an abundant water-power, many mills and quarries of Potsdam sandstone; and is the seat of a State normal and training school. Population 1890, 3,961.

POTT, AUGUST FREDRICH, a German philologist, born in Hanover in 1802, died in 1887. He became professor in Halle in 1833, and was distinguished as a leading representative of the science of comparative philology.

POTTAWATTAMIES, a tribe of North American Indians of the Algonquin family. See *INDIANS NORTH AMERICAN*, in these Revisions and Additions.

POTTER, ALONZO, bishop of the Protestant Episcopal Church, was born in Dutchess county, N. Y., in 1800, died in 1865. He became bishop of Pennsylvania in 1845, and was a founder of the Divinity School and of the Episcopal Hospital in

Philadelphia. His son HENRY CODMAN POTTER, bishop of the Protestant Episcopal Church, born in Schenectady in 1835, was educated in Philadelphia, and consecrated there in 1883. HORATIO POTTER, bishop of the Protestant Episcopal Church, brother of Alonzo, born in Dutchess county, N. Y., in 1802, died in 1887, was consecrated in Trinity church, New York City, in 1854.

POTTER'S CLAY or FIGULINE, a kind of clay used in potteries for the manufacture of earthenware; the different varieties of it being adapted to different kinds of earthenware. Houses are built in Egypt of pots of this material. Potter's clay is also employed in agriculture for the improvement of light sandy and calcareous soils.

POTTSTOWN, a city of Pennsylvania, on the Schuylkill, twelve miles northwest of Phenixville. Population in 1890, 13,201. See *Britannica*, Vol. XIX., p. 643.

POTTSVILLE, a city, the county-seat of Schuylkill county, Pa., on the Schuylkill, at the base of Sharp Mountain. Population in 1890, 14,194. See *Britannica*, Vol. XIX., p. 644.

POTY, a district town, and rising seaport of Russia, in the Caucasian government of Kutais, at the mouth of the river Rion, on the eastern shore of the Black Sea. The Rion connects the port with the interior, and since the establishment of regular steam communication by the Russian Trade and Navigation Company in this quarter, the commerce and especially the transit-trade of this town have greatly increased. Population 1,309.

POUCHED RAT, a group of *Rodentia*, of which there are several species, natives of parts of North America west of the Mississippi and along the Gulf, some of them very troublesome from the ravages they commit in fields and gardens.

POUGHKEEPSIE, a city, the county-seat of Dutchess county, N. Y., on the left bank of the Hudson, about midway between New York and Albany. Population in 1890, 22,836. See *Britannica*, Vol. XIX., p. 644.

POUJOULAT, J. J. FRANÇOIS (1808-1880), a French historian. He studied at Aix and at Paris; traveled in Italy and the east; and wrote largely in connection with Michand.

POULTNEY, a village of Vermont, near the Poultney River, about eighteen miles west of Rutland. It contains quarries and manufactories of slate, and several foundries and mills.

POULTRY. See Fowl in *Britannica*, Vol. IX, pp. 491-2.

POURTALES, LOUIS FRANÇOIS DE, COUNT, a Swiss naturalist, born at Neufchatel, Switzerland, in 1824, died at Beverly, Mass., in 1880. He followed Louis Agassiz to America and served in the United States Coast Survey as civil engineer. By his papers on the Gulf Stream and the Caribbean Sea he obtained a high reputation as a hydrographer. He was associated with Agassiz in the study of natural history, and succeeded him in 1873 as custodian of the Museum of Comparative Zoölogy at Cambridge, Mass.

POWDERLY, TERENCE VINCENT, an American labor-organizer, born at Carbondale, Pa., in 1849. His parents were Irish Catholics. At 19 years of age he was at Scranton working in a machine shop. He became secretary of the Machinists' and Blacksmiths' Union there and remained so till 1880. In 1874 he was a delegate to the International Union at Louisville, Ky. Returning to Scranton he joined the Knights of Labor, and was made secretary of the District Assembly. He was then foreman in locomotive works. In 1877 he was elected mayor of Scranton, and reelected in 1878. In 1879 the Knights of Labor, at their convention in Chicago,

elected him as General Master Workman. Since that he has been continuously reelected to the same position. Mr. Powderly urged upon the Knights of Labor the abolition of the oaths and the removal of the obligation of secrecy, which demand was finally acceded to.

POWELL, BADEN (1796-1860), an English mathematician and philosopher. He became professor of geometry at Oxford in 1827.

POWELL, JOHN WESLEY, an American geologist, born at Mount Morris, N. Y., in 1834. He studied at Oberlin; traveled in the West; lost an arm in the Union army; began in 1867 a scientific exploration of Colorado; became director of the United States geological survey in 1881; and president of the American Association for the Advancement of Science in 1887.

POWER, THOMAS C., an American statesman, born near Dubuque, Iowa, May 22, 1839. He went with a surveying party to Dakota in 1860; engaged in the mercantile business on the Missouri River, and continued in that business till 1867, in which year he located at Fort Benton, the head of navigation; was president of the "Benton P." line of steamers; is interested in cattle, mines, and various mercantile companies; located at Helena, his present home, in 1878; was elected a member of the first Constitutional Convention of Montana in 1883; was elected to the United States Senate January 2, 1890; and took his seat April 16, 1890. His term of service will expire March 3, 1895.

POWNA, a village of Vermont, on the Hoosac River, ten miles south of Bennington. It contains excellent schools, and manufactories of cotton and woolen goods.

PRAIRIE DU CHIEN, a city, the county-seat of Crawford county, Wis., on the Mississippi, about three miles above the Wisconsin, and seventy above Dubuque. It is the seat of a number of flourishing educational institutions, and of a variety of important manufactures. Population in 1890, 3,122.

PRATIQUE, strictly, a limited quarantine. A ship is said to have performed pratique when her captain has convinced the authorities of a port that his ship is free from contagious disease; and he is thereupon permitted to open trade and communication with the shore.

PRATT, CHARLES, an American philanthropist, born in Massachusetts in 1830, died in 1891. He became a merchant in New York City; established the Standard Oil Company; and was the founder of the Pratt Industrial Institute in Brooklyn.

PRATT, ENOCH, an American philanthropist, born at Middleborough, Mass., in 1808. He removed to Baltimore and became a merchant and financier; founded the House of Reformation and Instruction for Colored Children at Cheltenham; established the Maryland School for the Deaf and Dumb at Frederick; endowed an academy in his native town, and established the Enoch Pratt Free Library in Baltimore, opened in 1886.

PRATTSBURG, a village of New York, about forty miles north of Elmira. It contains mills and foundries and an academy.

PRAYER FOR THE DEAD, the practice which prevails in the Roman Catholic, Greek and other Oriental churches, of praying for the souls of the deceased, with the intention and expectation of obtaining for them an alleviation of their supposed sufferings after death, on account of venial sins, or of the penalty of mortal sins, remitted but not fully atoned for during life.

PREBLE, EDWARD, an American commodore born in Maine in 1761, died in 1807. He distinguished himself in the Revolutionary war; and

commanded the squadron sent against Tripoli in 1803. His nephew, GEORGE HENRY PREBLE (1816-1885), was made rear-admiral in 1876, retired in 1878; was author of *History of the American Flag* and many other valuable works, and collected the exceedingly valuable sets of naval publications now in the navy department at Washington.

PRE-EXISTENCE, DOCTRINE OF. The notion that human souls were in existence before the generation of the bodies with which they are united in this world, was anciently, and is still, widely spread throughout the East. The Greek philosophers too were familiar with the conception. Among the early Christians, the assumption of such pre-existence was connected with the belief, that God had created the souls of men before the world, and that these were united with human bodies at generation or at birth. Direct intellectual interest in this doctrine has nearly ceased in modern times.

PREGEL, a river of Prussia, which rises in the province of East Prussia, where it is formed by the union of the Pissa and the Anegrap near Insternburg. It flows west, and after a course of more than ninety miles, enters the Frisches Haff. The Pregel is navigable even at Insternburg; and at Königsburg, is 270 feet broad. Its principal tributaries are the Alle from the south, and the Instern from the north. The canal of Deine connects it with the Kurisches Haff.

PRELUDE, in music, a short preface or introduction to a piece, intended to awaken the attention of the audience, generally smooth and flowing, and consisting of a short motive which is kept throughout; or it may be composed of a succession of harmonies uninterrupted or connected by passages. It is in the same key with the piece which it is to introduce, and to which it is intended as a preparation.

PRENTICE, GEORGE DENISON, an American poet and journalist, born in Preston, Conn., in 1802, died in Louisville, Ky., in 1870. He was long known as editor of the "Louisville Journal," and as an incisive and witty writer.

PRENTISS, SERGEANT SMITH, a highly gifted American orator, born in Maine in 1808, died in 1850. He became eminent as a jury lawyer in Vicksburg; represented Mississippi in the National Congress. His brother, GEORGE LEWIS PRENTISS, born in 1816, is a noted divine and educator. George's wife, ELIZABETH PRENTISS (1818-1878), daughter of Rev. Edward Payson, wrote *Stepping Heavenward*.

PRESBYTERIAN CHURCH. See *Britannica*, Vol. XIX, pp. 678-701.

PRESCOTT, a town, the county-seat of Yavapai county, Ariz., situated in the Pine Mountains, nearly two hundred miles north of Tucson. It is an important center of trade, and deals largely in bullion, wool, lumber, and cattle. The climate is delightful.

PRESCOTT, a village, the county-seat of Nevada county, Ark., pleasantly situated in a healthful region. It has excellent facilities for trade and shipment, and is the center of a rich cotton and corn producing region.

PRESCOTT, WILLIAM, an American Revolutionary officer, born in Massachusetts in 1726, died in 1795. He served against the Acadians in 1756; fought in Lexington; is said to have commanded the provincials at Bunker Hill where a statue perpetuates his memory; took part at Saratoga, and sat in the Massachusetts legislature. His brother, OLIVER PRESCOTT (1731-1804), was also a noted military officer. William's son, WILLIAM PRESCOTT (1762-1844), was an able jurist.

PRESSENSÉ, EDMOND, DEBOULT DE, a French Protestant divine and author, born at Paris in 1824, died 1891. He was elected a life senator of the Republic in 1883.

PRESTISSIMO (Ital. very quick), the most rapid degree of movement known in musical composition.

PRESTO (Ital. quick); in music, a direction that a piece should be performed in a rapid lively manner.

PRESTON, WILLIAM CAMPBELL, a United States Senator, born at Philadelphia in 1794, died in 1860. He settled in South Carolina in 1822. His brother, JOHN SMITH PRESTON (1809-1881), was a wealthy planter and a popular States Rights orator. Their uncle, JAMES PATTON PRESTON (1775-1843) was governor of Virginia and a distinguished statesman.

PREVENTION OF CRUELTY TO ANIMALS. The "Society for the Prevention of Cruelty to animals" of the State of New York, the first institution of the kind ever organized in America, was founded by Henry Bergh, of New York, and incorporated by an act of the legislature of the State of New York passed April 10, 1866 (see BERGH, HENRY, in these Revisions and Additions). In spite of great opposition from cruel drivers of horses, and the ridicule of many thoughtless people, Mr. Bergh continued his efforts to secure proper treatment of all domestic animals, and often arrested offenders personally in the streets of New York, until he at last succeeded in winning general commendation and public interest for the cause to which he had devoted himself. This was shown by the adoption in thirty-nine States of laws for the protection of animals. But most clearly by the last will of Louis Bonard, a Frenchman, residing in New York City, who died in 1871, and bequeathed to Henry Bergh \$150,000 worth of property for the use of the Society for the Prevention of Cruelty to Animals. Since this example was given, numerous other contributions have been received by this society, and several similar societies were formed in other large cities. At present thirty-four such societies exist in the United States.

These societies suppress the unnecessary infliction of pain upon animals, as it is done by beating them uselessly, by overloading draft-horses, or by using lame, sore, weak or disabled animals; they suppress cock-fighting and dog-fighting, and numerous other abuses of a similar nature. The New York society has uniformed officers in both New York City and Brooklyn. These officers see that all disabled animals are transported in ambulances to places where they can be properly treated. Two of these ambulances are in daily use in New York and one in Brooklyn. The society has also taken an active interest in the erection of drinking fountains to provide water for both men and animals.

The New York Society has from its beginning in 1866 till the present time prosecuted about 20,000 cases in the courts for the needless infliction of pain to animals, and has temporarily suspended from work some 40,000 disabled horses.

PRICE, BONAMY, an English economist, born in the island of Guernsey, died in 1888. He was educated at Oxford; became professor of political economy there in 1868; lectured on free trade in America; and wrote much on financial and economical subjects.

PRICE, STERLING, a major-general in the Confederate army, born in Virginia in 1809, died in St. Louis in 1867. He was a member of Congress; served in the Mexican war; was governor of Missouri; served with distinction throughout the civil war; and organized a colony in Mexico.

PRICKLY HEAT, the popular name in India and other tropical countries for a severe form of the skin disease known as *Lichen*. It more frequently attacks strangers from temperate climates than the natives. The sensations of itching and stinging which attend it are intense. Little or nothing can be done in the way of treatment, except keeping as cool as possible.

PRIMA DONNA (Ital.), the first female singer in an opera.

PRIME, SAMUEL IRENEUS, an American clergyman and editor, born in Ballston, N. Y., in 1812, died in 1885. He was well known as the able editor of the "Ireneus" of the New York "Observer," and author of *The Power of Prayer*. His brother, NATHANIEL SCUDDER PRIME, (1785-1856), was a noted divine and reformer, Their brother, WILLIE COWPER PRIME, born in 1825, is an eminent journalist, well known for his letters to the New York "Journal of Commerce" and as a patron of art. Another brother, EDWARD DORR GRIFFIN PRIME, born in 1814, is the "Eusebius" of the New York "Observer," and was its editor from his brother's death to 1886.

PRIMROSE (*Primula*), a genus of plants of the natural order *Primulaceæ*, having a bell-shaped or tubular 5-toothed calyx, a salver-shaped corolla with five segments, five stamens, a globose germen containing many ovules, and a many-seeded capsule opening with five valves, and generally with ten teeth at the apex. The species are all herbaceous perennials, generally having only radical leaves; and the flowers in a simple umbel, more rarely with scapes bearing solitary flowers. Almost all of them are natives of Europe and the north of Asia. Some of them are among the finest ornaments of our groves and meadows; some are found in mountainous regions. Their fine colors and soft delicate beauty have led to the cultivation of some of them as garden flowers, probably from the very beginning of floriculture. The name primrose (Fr. *Primevère*, Lat. *Primula*) is derived from the Latin *primus*, first, and refers to the early appearance of the flowers of some of the most common species in spring.—The common primrose (*P. vulgaris*), abundant in woods, hedgebanks, and pastures, has obovate-oblong, wrinkled leaves, and single-flowered scapes; the flowers about an inch broad, yellowish-white. This is the plant to which the English name primrose specially belongs. Akin to the primrose is the cowslip which some botanists regard as an extreme form of a species of prim-

rose. The American cowslip, *Dodecatheon Meadia*, is one of our most beautiful wild flowers. It is found in woods from Pennsylvania to Wisconsin and southwardly, and bears a gracefully drooping cluster of pale purple flowers. The Polyanthus and Auricula are beautiful garden flowers, the first being the result of cultivating a variety of cowslip, and the latter of an Alpine species of primrose (*P. auricula*). See Britannica, Vol. XIX, pp. 737-8.

PRIMROSE LEAGUE, a league originated in England in 1883, in memory of the late Earl of Beaconsfield, and so called because on the anniversary of his death every member wears a bunch of primroses. The members, who include both sexes, are styled Knights, Dames and Associates, and their branches are called Habitations. The members of the Primrose League have taken active part in electoral campaigns, and have exercised considerable influence in London and its neighborhood in favor of the Constitutional-Unionist candidates. In 1891 there were 949,118 members, including Scotland, divided among 2111 Habitations. Habitations have been established in India, Malta, Cyprus, Sydney, British Honduras, Mauritius and Hong Kong. The official organ is "The Primrose League Gazette."

PRINCETON, a village, the county-seat of Bureau county, Ill., about twenty miles west of Mendota. It is engaged in mining coal and in manufacturing agricultural implements and flour.

PRINCETON, a village, the county-seat of Gibson county, Ind., twenty-five miles south of Vincennes. It is a flourishing center of local trade. Population in 1890, 6,494.

PRINCETON, a village, the county-seat of Caldwell county, Ky., about forty-five miles east of Paducah. It is the seat of Princeton College, and contains a number of mills and factories.

PRINCETON, a village, the county-seat of Mercer county, Mo., at the outlet of Big Lake, twenty-two miles west of Calais. It contains manufactories of lumber, shingles, woolen goods and leather.

PRINCETON, a borough of New Jersey, ten miles northeast of Trenton. See Britannica, Vol. XIX, p. 742.

PRINCETON, a village of Wisconsin, on the Fox River, thirty-five miles west of Fond du Lac. It contains a number of mills, foundries and carriage shops.

PRINCIPAL, a presiding governor, or chief in authority. The word is often applied to the head of a college or university.

PRINTING

PRINTING, PRINTING PRESSES AND TYPOGRAPHY. For the complete history of the invention and progress of the art of printing, in all its many departments, and a full exposition of that art, together with accurate definitions and descriptions of the phraseology of the composing room and press room, the reader is referred to *Britannica*, Vol. XXIII, p. 681; also to the Index under the various titles. The evolution in the mechanics of printing has during the past generation, been greater than ever before known in the whole history of the art. Especially is this to be noticed in the matter of presses. In order to better appreciate the remarkable developments, it will be well to trace the various stages of growth.

In the primitive Chinese method of printing, copies were obtained from the engraved blocks by merely rubbing or tapping with a stiff brush the backs of the sheet of paper to be printed. The process was necessarily very slow.

In the *Old Wine Press* of Gutenberg, the sheets were laid on by hand, and the ponderous screw turned slowly down, also by hand, to form the impression. Not more than fifty impressions could be made in an hour. The *Blaew* press of 1620, was a radical improvement, and of so marked a character that for more than a century and a half it stood alone, no attempt at advancement being made. The screw as a lever was not abandoned, but simplified, as well as the carriage. A "coffin" was built serving as a receptacle for a stone, usually of marble, which was the bed of the old presses. The capacity of the *Blaew* press was about 150 impressions an hour, with two men.

The *Stanhope* press, built in the latter part of the 18th century was wholly of iron, and was immediately received by the printing world as a remarkable advance in the art of printing press construction. It may be considered as the first real improvement upon the press as originally invented having been preceded by an incomplete attempt in America afterwards perfected into the *Columbian* press, and also in France by a plan proposed by Annison. Its capacity was about 180 impressions an hour, with two men.

The *Franklin* press, also brought out in the latter part of the 18th century was a modified form of the "*Blaew*," and was capable of giving 250 impressions per hour. The press that was worked by the great philosopher and printer, Benjamin Franklin, is treasured in the Patent Office at Washington, as one of the choicest relics of the nation.

The *Columbian* press invented by George Clymer about 1817, unquestionably exhibited the greatest amount of improvement ever attained in any one instance in hand printing machinery. Its strength of material and scientific combination of power took off an amount of wear from the pressman never before achieved. Its elbow pulling-bar, its diagonal connecting rod, which changed a horizontal movement into a perpendicular one, and its main lever, applying its weight directly to the form, commended it to all pressmen. It became especially popular in England, where large numbers were manufactured and sold, although the inventor was an American.

The *Washington* press, invented in 1829, by Rust, was the last of the leading representative hand presses, and the best. It is in general use today in the United States, and undoubtedly marks

the limit of inventive genius in the line of hand presses. It avoided the complexities of the *Columbian*, and, while it combined every good feature required in a hand press, avoided all the objectionable ones. The toggle-joint, which is peculiar to this press, gives with the minimum of exertion, a very heavy impression when desired; the parts are generally simple, and easily understood. The bed slides on a track, and is by the left hand run in under the platen by two turns of a crank with a belt attached to its pulley. The right hand seizes the lever handle, and the platen is depressed by a compound lever acting on the toggle-joint. The platen is restored to its normal position by lifting springs on either side. Its tympan is a frame covered with cloth and attached to the bed. It is on this that the sheet of paper is laid. A delicate frame above it, called the frisket, is folded down holding the sheet of paper by the margin. The crank is turned, the bed run under, the impression given, the crank reversed, the tympan and frisket lifted, and while the sheet is being removed, an attendant inks the form preparatory to the working of the next sheet. The *Washington* has stood the test for two generations, and it is doubtful if any hand press can be invented that will be an improvement on it. It is the highest type of hand press.

The only improvement thus far suggested, is an elaboration of an idea suggested and acted upon by Dr. William Church, of Connecticut, in 1821. In the press invented and manufactured by him, he dispensed with the roller boy, and other hand features, accomplishing the work by mechanical appliances. He laid the sheet on the tympan, and applied his hand to the rounce, by the turning of which the form was inked. Then the frisket and tympan turned down; the bed ran in, and the impression was given. A reverse of the motion reversed the process; and while the press was in action it prepared for the next sheet.

Doctor Church was one of the greatest inventors of his age; and his name is justly linked with the noblest of those emblazoned on the escutcheon of the Art. Preservative of all Arts, for originality of thought, and far-seeing ideas of invention. His genius, as shown on the hand press especially, elaborated three distinct principles: First, the mode of obtaining the pressure; second, a particular arrangement of the inking apparatus; and, third, the raising and lowering of the frisket, whereby the paper was placed and automatically removed after having received the impression of ink. His ideas were, however, regarded as chimerical by the majority of printers, principally by reason of jealousy. Had his life and courage been prolonged, he might have seen his improvements fully carried out in his own time as they have since been. The London "*Journal of Arts and Sciences*" said in reference to Church that his "extraordinary association of mechanism embraced a more extensive range of invention than we remember ever to have seen before projected by any one individual and combined under one patent."

Two generations have passed, and the dreams of Church have been realized. There is now (1891) manufactured an excellent hand press which has an automatic inking and delivery attachment and is known as the "*Schorn*" (fig. 1) from the inventor, T. G. Schorn, of Iowa. The form is rolled during the movement of the bed forward and backward. The ink is supplied from a fountain and conducted

by a feed roller to the distributing table, from which the form rollers receive their supply in turn. The distribution is accomplished by angle rollers. The feed is similar to that on cylinder presses, and may be done by the pressman, or by a feeder standing on the opposite side of the press. When the latter is done the pressman has only to run the bed in, pull the impression, and run the bed out, everything else being done automatically, even to the delivery of the printed sheets. The register is equal to that of ordinary cylinder work, and the inking is far better than is generally done by hand. The attachments are manufactured for seven, eight, and nine column presses. The capacity of the press is doubled.

JOB PRESSES.—The first step in the way of labor-saving appliances in connection with the art of printing, was the treadle—a utilization of foot power, whereby the hands were left free for other use than giving power. The treadle machine is necessarily very different from the hand press as previously used, inasmuch as the power is to be applied from below by the feet, instead of from above by the hand and arm.

The pioneer press (fig. 2) of this description was invented by an American, Daniel Treadwell, who went to England in 1820, and took out a patent. It was the first of a very important series of inventions pertaining to printing, each one an improve-

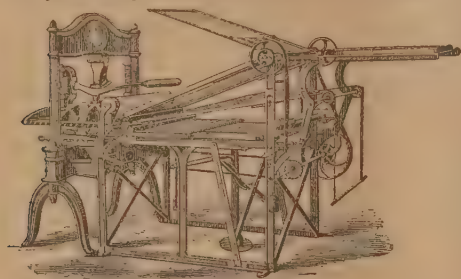


FIG. 2—THE "SCHORN" PRESS.

ment upon its predecessor. There was great originality in the construction of the Treadwell; its operations were conducted with much facility by one man, and as the rolling of the table, and the horizontal movement of the bar were dispensed with, the labor was greatly reduced.

A general description of the principles involved in the construction and working of a treadle or job press, especially one of the present day, will show a frame work with the pedal necessarily at the bottom. It is the simplest of machine presses worked other than hand power. It consists of a bed for the reception of the form of type properly secured in its chase. The bed, unlike that in the hand press, which has bed and platen both horizontal, is fixed at a convenient angle, usually perpendicular, or nearly so, while the platen on which is placed the blank sheet or card, is at an angle convenient for examination and any needed adjustment.

The two, the bed and the platen, are like open jaws at an open angle of about 50°. The form of the type secured in the chase, is clamped to the bed, when the platen, by the action of the treadle, rocks on a pivot and comes into parallelism with the bed. As it approaches the type the gearing operates a lever varying in different machines, and at the instant of absolute parallelism gives an impact of regulated strength.

The inking of the form is automatic and is done by feeding the ink from a reservoir in the back

part of the press, by a series of rollers playing in an erratic manner on a revolving disc where the ink is evenly distributed, and given by the final rollers controlled, to the surface of the type, from which as the platen advances toward the type, the rollers are quickly and automatically withdrawn, leaving the surface of the type ready for the impression. The operator, while one foot is working the treadle, has both his hands for use in feeding the blank sheets or cards, and taking away the printed work. The speed varies in different machines from 800 to 1,500 impressions an hour according to the skill of the operator.

While there are very many job or treadle presses in the market, there are four which may be called the best representatives of the class in general: the "Ruggles," the "Degener" or "Liberty," the "Gordon" and the "Universal" or "Gally." The "Ruggles" press was invented by S. P. Ruggles, about 1830. It simplified very materially the features of its predecessor, the Treadwell, and became such a favorite that it was universally popular, and was in use for many years. The "Degener"

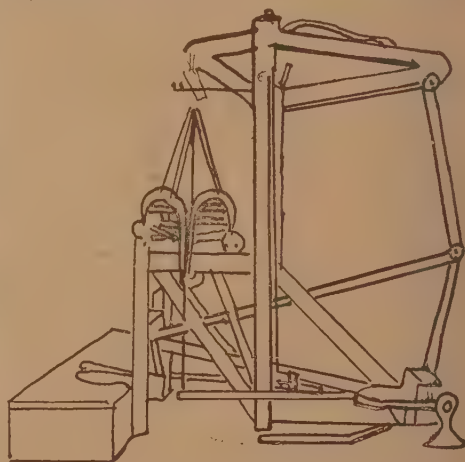


FIG. 2—THE PIONEER TREADLE, OR JOB PRESS.

or "Liberty" press (1858), was the invention of a Mr. Degener who made America his home. His principal idea was to cause the approach of the platen and bed in such a way that the type should not receive any wearing at the lower edges. This was attained by what was technically called the "goose-neck joint," whereby the pressure was applied with absolute evenness to the bed. While the press is an American invention, the output of the factory is almost entirely shipped to Europe. It obtained the prize medals at the London Exposition in 1862, and the Paris Exposition in 1867.

The Gordon Press.—Possessing an ample genius, Geo. P. Gordon, of New York, took up the matter of treadle presses in 1850, and simplified them very greatly, adding new features, and correcting errors in old ones, until he built up an enormous business. He realized a fortune, and the name of Gordon Press ranked, and still ranks high among the presses on the market, because of its original features.

The Universal Press (fig. 3), invented in 1869 by Merritt Gally, of New York, combines all the best features of every previously named press, with marked improvements. Simplicity of mechanism, and ease of action have been studied and

attained. As the Washington has for two generations been regarded as the highest type of hand press, so the Universal or Gally would seem to be the highest type of treadle press yet attained. It is adapted to the finest and most delicate kinds of printing, and can by the change of a few screw regulators, be converted into an embossing press of most marvelous power.

The press is something on the principle of the Universal in its construction, and made with the most enormous strength and solidity of build. The cutting face is 33 inches by 30 inches. An improved platen movement has peculiarly adapted this machine for either stamping or paper-box cutting. So universal has the desire for knowledge regarding the art of printing become in America,

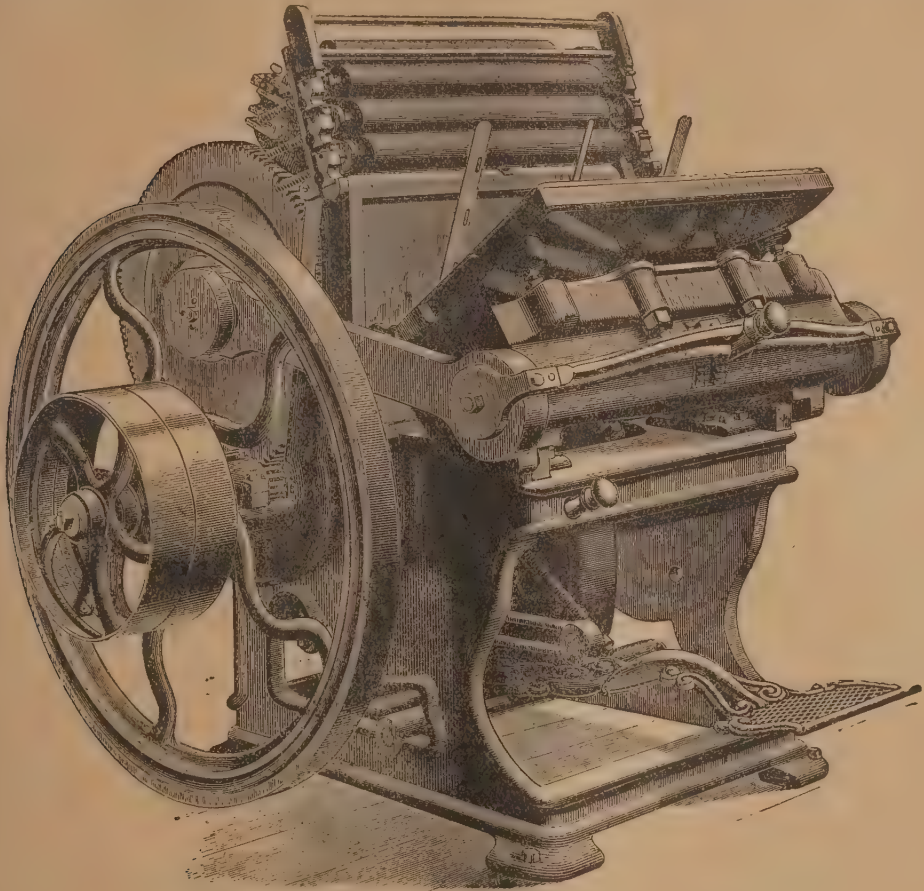


Fig. 2.—THE GALLY UNIVERSAL, THE HIGHEST TYPE OF TREADLE PRESSES.

To the foregoing list may properly be added the Ohampion, Prouty, Kidder, Globe, Pearl, Nonpareil, Novelty, Hoe, Model, and Willard presses, all of American invention and manufacture.

Nearly all the manufacturers of treadle presses have of late years added a wheel for belt power, thereby increasing their capacity, and affording a steadier working to the machine.

STAMPING AND CREASING PRESS.—The first printing presses adapted to the work of cutting and creasing paper and pasteboard for boxes were made by M. Gally, of New York, early in the year 1876; since which time they have become universally popular.

that immense numbers of presses of every size style, and make, are to be found in the market. They range from the small boy's outfit costing a dollar, onward through the various grades of amateur work, and small office requirements to the most costly of the mighty perfecting press. Of the small presses one of the most serviceable was the Army press.

This was small, portable, and made of very great strength and compactness, being designed especially for service in the field. These presses were attached to many camps during the civil war in the United States, and proved remarkably ser-

vicesable. In general construction there is a bed, the tympan, on which the sheet is placed; a roller platen carefully adjusted to the bed, and a crank. Their simplicity of mechanism, and extreme durability rendered them available for the hardest service.

POWER OR CYLINDER PRESSES.—For other matter concerning CYLINDER PRESS, see *Britannica*, Vol. X., III, pp. 705-6. Self-acting presses were totally unknown before the present century. The first conception of such a mechanism originated with William Nicholson, of England, in 1790, but the first

central cylinder, were made and successfully worked.

In the United States an immense amount of care, ingenuity and talent were displayed by various manufacturers in perfecting printing machinery—much more so than in any other country in the world—and adapting it to the latest needs. The immense number of presses in use is a sufficient proof of their popularity among printers, both in Europe and America.

The first advance on the Koenig cylinder was made by Applegarth and Cowper, in 1827, sixteen

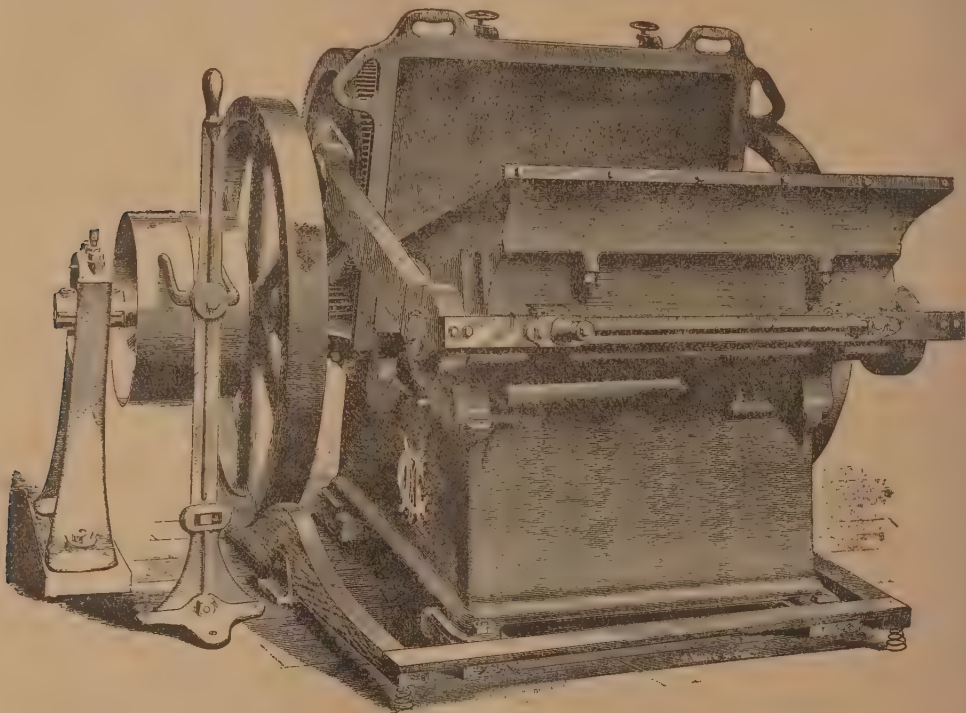


FIGURE 4.

man to construct a working model was Frederick Koenig, in 1811. In his machine ordinary type was used; the form was flat, and passed beneath a large cylinder, which delivered the impression. This was the first actual cylinder known to history. It was a success, and at its first trial startled the printing world by throwing off 800 impressions an hour, afterwards increased to 1,100. The London "Times" immediately ordered two machines to be made, and, Nov. 29, 1814, went into an ecstasy of editorial delight over their successful working.

A careful examination of the Nicholson machine, as described in his specification, shows that all subsequent attempts at machine printing are but modifications of the principle evolved in his fertile brain, whether they be cylinder or rotary in action.

Ever since the practicability of using a cylinder in presswork was demonstrated, improvements and extensions of the idea have rapidly progressed, until eventually presses of two, four, six, eight, and even ten cylinders, working upon a principal

years after Koenig's success, when they produced an improved press for the "London Times." It had four cylinders, and gave 4,000 to 5,000 impressions in an hour on one side of the sheet. It was regarded as a remarkable advance in the matter of presswork.

Donkin and Bacon's Machine (1813) was built for the University of Cambridge. Several forms were attached on the sides of a prism, and were presented consecutively to the inking cylinder and paper cylinder. This machine was cumbersome and soon passed out of date. It was the first printing machine in the world to discard the ancient hand-ball, and to adopt composition inking-rollers made of glue and molasses.

For a long time there were serious prejudices against cylinder press printing work, because of its inaccuracy, and it is only in very late years that the problem has been satisfactorily solved. As a result of the improvements made, cylinder presses are now used for the finest of book and engraving work. Improvements have followed with wonder-

ful rapidity, and what was but a few years ago deemed an impossibility, has now become an acknowledged fact. The large number of manufacturers, and the consequent rivalry for the highest point approaching completeness in manufacture and perfection in work, have given to the printing world a series of presses that are the wonder of even the present age. In some of the cylinder presses the adjustments are so exquisitely refined in their movements that it is impossible to print a sheet out of register. If the sheet be fed with the slightest variation from absolute correctness, it is automatically thrown out unsoiled.

Cylinder presses may be generally described as having a reciprocating bed, which is passing backward and forward over a limited track. Above this there is a fixed, revolving cylinder to carry the paper over the type which is itself placed in a flat form for the impression. As the cylinder revolves, the bed with its form passes beneath, receiving the pressure, then returning, receives a new inking,

The "Large" Cylinder gives but a portion of its surface to the impression of the form, a large segment being removed which, while the cylinder revolves, permits the form to return without the cylinder being lifted. The "Drum" Cylinder is a single large cylinder press, bearing the name "Drum" because of similarity in form to a huge bass drum. It is not very rapid, but has peculiar advantages in fine work.

The "Stop" Cylinder is so arranged that the cylinder stops automatically after the sheet is printed, and remains stationary while the bed is running back, during which time a fresh sheet is placed in position.

The "Double Ender" is fitted with two fountains, one at either end of the press, which supply the ink in equal quantities, and, at the head and tail of the form receive exactly the same amount.

The remarkable, as well as rapid development in the mechanics of the cylinder press is best shown by a comparison of the first one built in 1814, and

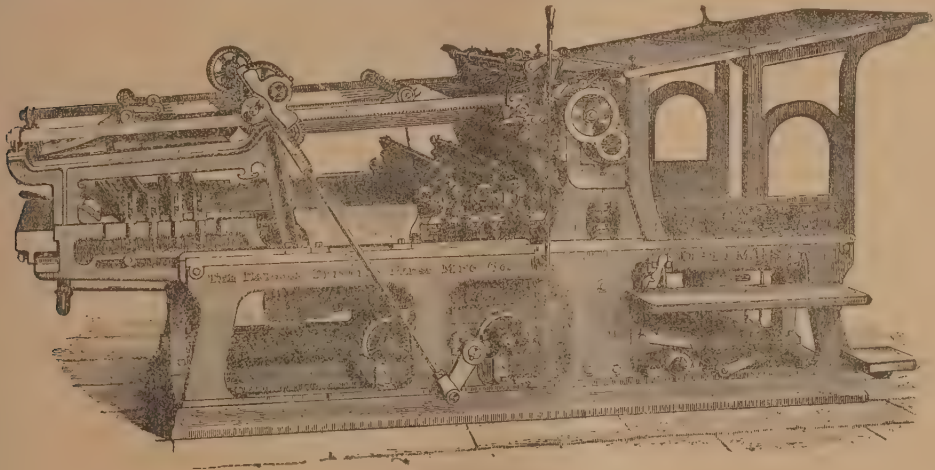


FIG. 5.—THE "OPTIMUS."

when it is ready for the next sheet. The sheets are fed in from a table, or "feed board" at one end, and above the press, while the inking is accomplished at the other. In some of the later improved styles inking fountains are put at both ends. To such a fine point has inventive genius reached in the matter of inking, that in many presses an absolute uniformity of color is secured by taking the needed amount at each succeeding impression.

Power, or cylinder presses, are variously designated as "Single," "Double," "Large," "Small," "Drum," "Stop," "Double Ender," etc. The "Single" Cylinder is a press with but one cylinder whether "Large," "Small," or "Drum." The "Double" Cylinder has two cylinders over which the sheets of paper are fed to one form. The form travels under both, and each cylinder has a feed-board with an attendant, one on either side of the press. At each round trip of the bed an impression is taken from the two cylinders. An inking fountain is provided at each end. While very popular for a time, they have yielded to improvements and are rapidly becoming things of the past. "Small" Cylinder has the circumference of its cylinder so constructed that it will cover the form complete in a single revolution. It is especially adapted for quick work.

the highest type of those built at the present date.

THE ADAMS PRESS.—In 1824 Daniel Treadwell conceived the idea of a power press, but was unfortunately burned out, and abandoned the matter. Isaac Adams took up the work and produced a press which, while it was neither a hand press nor a cylinder, held an important place in the printing world. The Adams had a stationary platen, and a bed that did not move backward and forward. Its only movement was up, to press against the platen, and down to its former place again. This rise and fall was a considerable one, as the rollers had to pass between the form and the impression surface. The sheet was fed in from above the ends of the machine, and was taken to the point of impression upon a frisket, with a power estimated at from forty to sixty tons. Fifty-four sizes and styles were made including two, four, and six roller presses. The Adams presses were favorites for more than fifty years, and some are in use even at the present date.

ROTARY PRESSES.—Rotary presses are those that, instead of having a flat bed upon which the cylinder acts, have two cylinders, one of which carries the type, and the other the paper. Both revolve,

and the paper passes between them and receives the impression. The rotary press was originated by Nicholson in 1790, but his attempt to produce a working machine proved unsuccessful, because he tried to use bevelled type. The matter was completely remedied by the stereotyping process.

COLOR PRINTING—Chromatic Printing Press.—An American invention by Sutterlin, Claussen & Co. The surface of the inking cylinder is divided into three equal parts, which are supplied with adjustable sectors (or color strips) of various sizes. Each part is also supplied with a color from one of the distributing rollers. Each color has its own vibrating and distributing rollers, with lateral motion, giving as much distribution to each color as is given to the ordinary one color job press. No sectional rollers are used. The colors are printed without blending, leaving the line of demarkation

simply ten presses working on one great cylinder, and was probably the largest press or combination of presses ever manufactured. The noise it made was terrific. The name of "Lightning" was afterward abandoned, and that of "the old threshing machine" substituted.

All the foregoing presses, and styles of presses printed the sheet on one side only. The paper was then turned over, new forms adjusted, or another press used, and the impression for the second side taken.

PERFECTING PRESSES.—The original of Perfecting Presses (fig. 7) was invented by William Nicholson, in England. A British patent was granted him in 1790, but nothing was ever done with it. According to his idea the sheets were to be fed by hand, as in the ordinary cylinder presses, then passed over and between a pair of cylinders for the first impression, and then over and between a second pair for the second impression, thus completing the print, and perfecting the sheet.

Whether Mr. Koenig was indebted to Mr. Nicholson for his elementary principles in the construction of his celebrated presses for the "London Times" in 1814, or whether almost the same ideas occurred spontaneously to each individual, is a question that can only be satisfactorily answered by Koenig himself, and he is beyond recall.

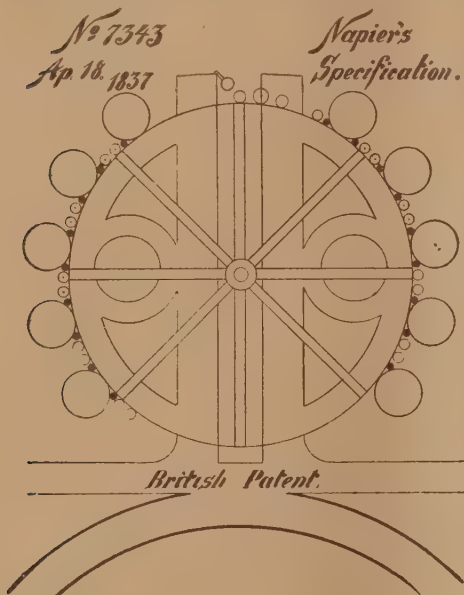


FIG. 6.—THE NAPIER TEN CYLINDER PRESS (1837), CALLED IN AMERICA "THE TEN CYLINDER LIGHTNING PRESS" (1847).

clear and distinct. The form may be placed in any part of the bed, and worked equally as well as in the center.

NEWSPAPER CYLINDER PRESSES.—After Koenig's success in printing 800 impressions an hour, and later, 1100, the multiplication of cylinders was begun. The Applegarth and Cowper (1827) used in their machine four vertical cylinders, but the capacity of each was not greater than that of the Koenig cylinder. Napier, in 1837, obtained a British patent for a ten-cylinder press, the ten cylinders lying horizontal to, and around the great cylinder which contained the forms. Each cylinder necessitated a feeder. Napier's press had a tendency to throw the type out, as did indeed all the presses up to his time. But the thickening of the upper portion of the column rule, an American invention by mechanics in the Hoe & Co. printing press factory, caused the rules to act as binders, and a higher speed was obtained.

The Napier press (Fig. 6), called in America the "Lightning" (1847), was a mammoth affair. It was

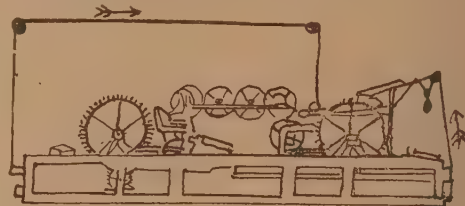


FIG. 7.—THE ORIGINAL OF "PERFECTING" PRESSES.

The "London Times" press of 1814 was not, however, a perfecting press. The first practical working machine of this class was built by M. Koenig, and was set up in 1817, thus following within three years his famous cylinder press driven by steam for the "Times." The new machine was called the *Bensley*, the Messrs. Bensley having contributed financial and moral assistance, and Koenig desiring to show his gratitude for their efforts in his behalf. In fact, without their aid Koenig would have failed in his enterprise.

The "Bensley" was credited with turning out from 800 to 1000 finished sheets per hour; but some very peculiar conditions regarding price and royalty prevented its general adoption; and its manufacture was gradually stopped.

More than forty years passed by, when American genius stepped to the front, picked up the scattered links, and produced a machine which completely revolutionized the printing press and everything connected with it.

In 1860, William A. Bullock, of Pittsburg, Pa., built the celebrated *Bullock* press and the Cincinnati "Times" had the honor of using the first machine turned out from his shops. It was a success. In carrying into practice his plans, Bullock fed the paper from a roll containing five or six miles of linear measurement, moistened it by passing it through a spray, carried it between the impression cylinder and the form, first one side, then for the other, and cut the sheets at proper intervals with great precision with a serrated knife which struck the paper with lightning-like rapidity. This knife was so constructed as rarely to need sharpening.

The forms of stereotype plates were mounted on cylinders, each having its own impression cylinder and inking apparatus. The roll of paper having been mounted in its place, the machinery was started, and the paper unwound as fast as needed. In the earlier presses the sheets were automatically delivered on the receiving board at the rate of 11,000 finished sheets an hour. By a most unhappy accident the celebrated inventor lost his life by being crushed in his own machinery, and a gloom fell on the printing world.

Fortunately for the success of the "Bullock" press Mr. Bullock had for an assistant a skilled workman who entered heartily into all his confidences. This assistant named Holberg, feeling proud of the success so far enjoyed, spurred on by his own genius, pushed ahead until in 1877 he had so improved the mechanism, that the "Bullock" press readily struck off 20,000 complete newspapers inside of sixty minutes, and did it in such a way that the counting could be verified by the looker-on. Thus the "Bullock" took the first place in the world of printing mechanism.

The remarkable changes indicated by the introduction of the "Bullock" Perfecting Press, set manufacturers and inventors in Europe and America to work with renewed zeal, and various improvements were suggested, made, patented, and put in operation. These efforts gave to the printing world a series of machines that are doing their best to out-rival each other. The "Walter," the "Victory," the "Alauzet," the "Ingram," the "Augsburg," the "Maranoni," the "Campbell," the "Hoe," and the "Scott," are all representative presses, and deserve more mention than the limits of this article can afford.

The daily demand for the latest news began to reach herculean proportions, and in 1868 the *Walter* Press was imported from England, where it had superseded a Hoe on the "London Times." Up to the date of the Bullock and the Walter, with the exception, as mentioned, of the Bensley, the impressions had been made on one side only. The paper was then turned over, new forms adjusted, or another press used, and the impression for the second side taken. In the new Walter, the paper, as in the Bullock, dropped out printed on both sides. The Walter claimed a capacity of 11,000 complete papers in an hour, or 22,000 single impressions.

The rush of invention had begun. Walter began to improve his presses, and Maranoni, of Paris, came forward with some original ideas and produced the celebrated Maranoni press.

The Web Perfecting Press.—The history of the Web Perfecting Press begins in 1835, when Sir Rowland Hill, who became famous for his advocacy of penny postage in Great Britain, obtained Letters Patent for a Web Perfecting Press, that is a press capable of printing from a roll of paper on both sides, and cutting and folding the sheets.

The roll is one continuous sheet of paper varying in length from three to nine miles, and of a width required by the size of the sheet to be printed. It is so compactly wound that it is easily handled, and when placed in its bearings at the end of the press (or sometimes above it), uncoils very readily, being fed into the machine at any speed required.

In some presses the roll is cut into sheets before being fed to the forms; in others, the cutting is not done until after the final impression and just previous to entering the folder.

The Serrated Blade.—In 1853, Victor Beaumont, of New York, patented the serrated cutting blade, set lengthwise in one of a pair of cutting

cylinders, having elastic surfaces inserted to hold the paper on each side of the cutting blade when the sheet was cut from the web. To this device is largely due the success of all web printing presses.

The Improved Walter.—The Walter Press, had in 1876, been so improved, that at the United States Centennial there was exhibited a specimen machine from which 17,000 copies of finished papers were produced in an hour, as against 1,100 sheets impressed on one side only fifty-eight years before. This was in the ratio of 34,000 to 1,100 impressions. It shows the evolution of one press, the Walter, in a trifle over half a century.

The Victory.—This machine was invented in 1877 by Messrs. Duncan & Wilson of Liverpool, Eng. While it was generally built on the same principle as the "Bullock," yet there were many important variations, and an added advantage in the facilities for folding the sheets as they left the press. It would print, cut, fold and deliver 8,000 complete papers per hour, of an eight-page paper fifty inches square; or print, cut, fold and paste, at the back, 7,000 24-page sheets per hour.

The Alauzet.—The Perfecting Press of M. Alauzet, of Paris, was built in an extremely compact form, and embraced, with varying motions, the same general features for the giving of perfect impressions on a curved surface where it is desirable and even necessary to use cuts and engravings in book and newspaper work. He accomplished by different methods what was also gained by Walter in his most successful effort in reference to cut and engraving printing.

Ingram Illustrated Work Printing Machine.—So fast has one improvement followed another in the past two decades that that most difficult of all work, printing cuts and engravings is at last most thoroughly accomplished. It has heretofore been so surrounded with apparently insuperable obstacles, that the flat bed press with its comparatively slow movement has been obliged to be relied on, but the difficulties have been overcome, and web presses with plates curved over the cylinders have been introduced with marked success.

In 1877, William J. Ingram, son of the founder of the "Illustrated London News," secured a patent for an invention on a web printing machine whereby the sheet was fed into the mechanism receiving the first imprint from the letter-press form; thence it was carried diagonally downward to the picture cylinder which printed the illustrations on the other side. A species of guillotine cuts off the sheets at the proper places, whence they were carried to the folding machine. The finished papers were delivered at the rate of 6,500 an hour.

It has always been found in practice that cuts or engravings require much more careful inking than the letter press, and that the ordinary inking arrangements, which are found to answer very well for letter press, will give but very imperfect work from engraving or cuts. It has been found well-nigh impossible to obtain satisfactory impressions from cuts or engraving plates bent to the sharp curve required to correspond to printing cylinders of the ordinary size.

These difficulties were overcome by increasing the diameter of the cylinder on which the plates for the cuts were placed, so that the curves to which the cuts or engravings were fitted might be gentler and of longer radius than the curve of the other printing cylinders.

In 1878 there was built by Ingram and exhibited at the Paris Exposition, a second machine, which had the cylinders of such size that three whole sheets could be printed at each revolution. The

curvature of the plates was so slight that the printing was regarded as fully equal to that done on the ordinary flat surface.

The Campbell Web-Perfecting Press.—In 1876, Andrew Campbell, of Brooklyn, N. Y., contracted to build for the Cleveland "Leader," a press from which 12,000 copies could be printed in an hour, and constructed the first press that printed, inserted, pasted, folded, and cut in one continuous operation.

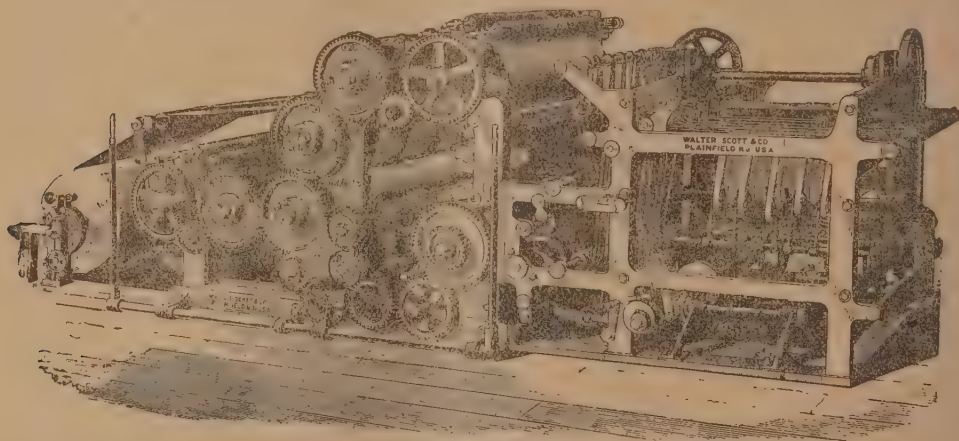
A second press was built on the same pattern, and exhibited at the 1876 Centennial. It was afterwards erected in an office in Jersey City, where it is still at work. The machine is remarkably simple in construction. The type-cylinders with their corresponding impression cylinders are placed in a perpendicular plane. The sheet is fed in at one end; it passes between the respective pairs of cylinders, and is then carried over an archway to the folding department, where it passes downward by successive stages until it reaches the delivery board folded and ready for the carrier.

might justly appear that no further improvements could be effected in this department of the art of printing. But there is no limit to human ingenuity. Each year is producing some valuable additional to the mechanism used in the printing world, and no one can foresee the developments that may yet follow.

The Scott-Webb-Perfecting Press.—In 1879, Walter Scott, of Chicago, a machinist of rare ability, concluded to take up the "Bullock" where the ill-fated inventor and his able assistant had left off, and devoted himself to the production of a press which should be a legitimate and natural development of the "Bullock Revolutionizer."

He succeeded, and built a machine in Chicago, with a capacity 50 per cent. greater than any of its predecessors. He improved upon his own improvements, and in 1881, produced a press that would feed, print, cut, fold, and deliver 32,000 eight-page papers inside of sixty minutes.

No man can spring to the front and present a good thing without finding an abundance of imi-



THE SCOTT ROTARY WEB-PRINTING AND FOLDING MACHINE.

The arch-way referred to is for the especial purpose of giving easy access to the interior parts of the machine as well as to the outer parts. It readily permits a man to stand up and work without injury while the press is in operation.

Only two of these presses were ever built, and both are still in use. Costly litigation was entered into against Campbell by the Hoe Manufacturing Company, which eventuated in the company's purchasing of Campbell's patents and then shelving them.

This press is a marvel of simplicity and easy manipulation. The cylinders are very small, the parts few, and the feeding of the web so gauged that the machine performs the best work with the least friction, noise, and inconvenience.

With the improvements made in the past twenty years, the press of America presents the most extraordinary combination of intellectual and mechanical power in the world. It is not only the means of disseminating knowledge among our own population, but also secures the high moral advantage of giving a tone to the literature of other nations, which should be favorable to peace, and a right understanding of the common interests of mankind.

Judging from the extraordinary perfection to which printing machinery has been brought, it

tators ready to pounce upon him and dispute his every step in progress. But Scott fought for his rights, and after a severe contest in the courts with his opponents, was paid large royalties for the privilege of using his inventions. He then set up his own works, and began to invent still further.

The Scott press of 1890 is regarded as combining all the best features of any and every machine yet put before the public. The folding appliances are especially simple and complete, and with a minimum of parts in general, the machine produces the maximum of results.

MAMMOTH PRESSES. The desire to build single machines that will produce the greatest number of papers in a given time, has led to the construction by various manufacturers of "quadruple" and "sextuple" presses. They are simply machines of mammoth proportions; or like the ten-cylinder rotary press invented by Napier, and culminating in the once celebrated "Hoe Lightning," consist of a multiplication of cylinders and forms in the same general frame-work.

The largest of these kind of machines are popularly designated as "Jumbos," and are simply mammoth in their construction. A press of this kind weighs about fifty-eight tons. It is ordinarily fed by three rolls of paper, each of sixty-three

inches width. When under way, the machine runs at the rate of fifty miles of white paper in an hour, and will print, cut, fold, and deliver, 144,000 4-page papers an hour.

While these monster presses perform prodigies of successful work, the slightest difficulty in any one part, serves to paralyze the whole of the machinery, causing an uncomfortable delay, hence they are by many regarded with disfavor.

The difference between a "Jumbo" machine, and a machine of moderate size, is easily illustrated. Let it be supposed for the sake of illustration, that a four-page paper is to be issued. The four forms are ready for the stereotyper. Their preparation requires on an average ten minutes, we will assume, before the plate can be put upon the cylinder of the machine.

A "Jumbo quadruple" will furnish four papers at every revolution, but it requires four sets of stereotype plates, and until they are all ready the ponderous machine is waiting.

Four ordinary machines, each capable of receiving the plates for a single paper complete, will accomplish a greater amount of work than a "Mammoth," as is easily evidenced by a trial at any critical juncture. For example: A mammoth press can produce 120,000 complete four-page papers in an hour, while each of four ordinary presses can produce but 30,000 in an hour. The stereotyper for either a large or a small press will require on an average ten minutes for the preparation of his plates. At the end of ten minutes the first set of plates is ready. One is put upon an ordinary press and the other upon the mammoth. The smaller press begins to move, while the mammoth is obliged to wait. At the end of ten minutes, when the second set of plates is ready to be put in place, the first press has turned out 5,000 papers. The greater press is not yet ready; it cannot work until all the plates are in place. At the end of the next ten minutes the first press has reeled off 10,000 copies, and the second press 5,000, when the third small press begins to move. Up to this time the mammoth has not accomplished anything. At the end of the fourth ten minutes, when the fourth set of plates are ready, the fourth press receives its plates at the same time as the mammoth.

Meanwhile the first press has delivered 15,000 copies, the second press 10,000, and the third press 5,000, before the monster has begun to move. Here is a total of 30,000 copies already in the mail or on the street before the mammoth makes its first puff. There is thus an immense saving of time. Besides, there is no more cost in four ordinary-sized presses than in one monster, as is easily verified.

Again, if anything goes wrong, or one of the monster presses breaks, either in little or in much, the whole machinery has to stop until the accident has been remedied. If an accident befalls a small press, its companions keep right on, and the delay is reduced to a minimum. The four machines of moderate size cost no more than the one of greater size, and are far more serviceable. Nevertheless, the fact is before the printing world, that a machine has been constructed which will give 144,000 complete copies of a printed four-page paper within sixty minutes, and improvements in it are still going on. What the next ten years may develop is a matter of conjecture.

COMPARATIVE GROWTH.—In order to show properly the wonderful advancement made, especially in later years, a table is submitted, that gives at a glance the successive steps of growth and improvement in printing machines from the beginning.

HAND PRESSES.

Year.	Name.	Capacity per hour. Impressions.
1450	The Old Wine Press.....	50
1620	The "Blaw" Press.....	150
1720	The "Stanhope" Press.....	180
1800	The "Franklin" Press.....	250
1817	The "Columbian" Press.....	250
1829	The "Washington" Press.....	300

POWER PRESSES.

1811	The "Koenig" Press.....	800
1814	The "Koenig" Press (London Times)....	1,100
1827	Applegarth & Cowper, with 4 cylinders, each cylinder.....	1,100
1837	{ Napier, 10 cylinder, also called "Hoe	
1847	{ Lightning" each cylinder.....	2,500

The foregoing presses gave impressions on one side only. In the following table, the reckoning is made of "perfected" four-page papers per hour.

1790	The "Nicholson" Machine. Patented but not built.....	
1817	The "Bensley" Machine.....	1,000
1860	The "Bullock" Machine.....	11,000
1868	The "Walter" Machine.....	11,000
1876	The "Improved Walter" Machine.....	17,000
1879	The "Scott" Machine.....	25,000
1881	The "Scott Improved".....	64,000
1891	The "Scott Improved".....	96,000
1891	The "Sextuple".....	144,000

The larger presses are especially built for printing eight, ten, twelve, sixteen, twenty and twenty-four pages at a revolution.

MECHANICAL TYPE COMPOSITION.—It is estimated that in the last two decades no less than \$10,000,000 has been expended in assisting inventors to develop a successful type composing machine, using that term in all its applications; while added to this, the amount of brain power and innate genius that have been put forth for its attainment is incredible. What have the results been? A great many brilliant ideas, some exceedingly ingenious toys, and a very few genuine accomplishments in a practical way.

Of the few which in their particular adaptations can be pronounced successful, there are two general classes: Those which handle type, setting the matter by use of regular, or especially constructed types and those working on the casting principle, that is, casting lines from assembled matrices.

Of type-handling machines, there would seem to be a sub-division into three classes: (a) those which are devised with the purpose of aiding in the type setting; (b) those which depend on gravity to bring the letters to a common point; and (c) those in which the letters are carried to a common point by mechanical means as belts, disks, and reciprocating bars.

There can be no doubt that the approximate results are very satisfactory, and offer warrant for predicting the early accomplishment of comparatively practical machines in each of the classes, although many machines have fallen short of satisfactory practical results, because the amount of labor saved in their use has not been sufficient to overcome the cost of the devices and the sacrifice of time and money required for their mastery.

The prejudice that the working classes usually exhibit towards machine methods is rapidly disappearing, so far as the printing world is concerned, and among intelligent printers even a feeling of friendliness is becoming manifest.

Of the theoretical machines but little more can be offered than a comment upon their constructive character. Some machines require special type of different size and shape from the ordinary, while all work on the key-board principle, first crudely suggested by Church, in 1822, whose idea had

doubtless been drawn from Herhan's old specification in the British Patent Office records, under date of 1794, the method proposed by whom, however, was widely different from anything seen since.

This principle of operating the machine by means of keys subtly responsive to the fingers of the workman has been considered the only way in which the primary work could be done; its objectionable features are those of the type-writer accentuated and multiplied many times.

Type-setting is an occupation demanding intelligence, a wide experience, and extended and never-ceasing study, and there would be a continued necessity for a machine to be improved with current development. An ordinary operator may be competent to strike keys, but in type-setting, something more is required. There must be the knowledge demanded and possessed by the practical printer, as well as the thoroughly trained compositor, both as regards spelling, punctuation, the "style" of the office, etc., and mere type-writer manipulation counts but little.

Church, of Connecticut, suggested the key-board principle in 1822. The casting system was pursued and was intended to supersede the manipulation of separate types. Movable matrices were cast in single lines.

His attempt was designated as the "Guide plate" principle. He put the types in channels, and operated them with keys arranged like the keys of a harpsichord. The machine was necessarily crude, and although embodying ideas which have since met with successful development, they were not at the time regarded with favor.

He devised the casting of types ready for the compositor, and have them (1) absolutely new every time they were used. That feature has reached its highest point up to this writing, in the improvements made by Mergenthaler and Rogers. Church also devised (2) the composing of the words so cast into words and sentences by the same process of casting; and (3) he produced printed impressions from the composition in the highest style of the art as known at that time, and with unexampled celerity.

Variations, modifications and improvements began to follow rapidly, beginning with about 1840, when Delacambre and Young took out the first of a rapid series of patents. Olay and Rosenberg, also in 1840; Joseph Mazzini, in 1843; William Martin in 1849; Mitchel, Boule, and Carlland, in 1853; Simoncourt, and Wiborg, in 1854; Coulon in 1855; Delacambre and Alden, in 1855; and Robert Hattersley, in 1857; all followed with their different ideas of improvement.

The Alden (England, 1856, and United States, 1857) was in practical use for many years in the large publishing house of D. Appleton & Co., in New York, on book work. Its capacity was rated at 3,500 ems an hour. Type of ordinary manufacture was used but each character had a nick peculiar to itself. The machine was about the size of an ordinary table, the upper part describing the outline of the letter D. The operator sat at one end of the flat side. The curved portion contained a horizontal wheel, holding the type in cells. By the rotation of the wheels several receivers were also made to rotate, and these picked up the proper types from their respective cells.

It was reserved for Hattersley to produce the first machine to remain in practical use for any length of time.

Hattersley was a practical engineer, and in the construction of his machine utilized the experiments made by his predecessors, but attained different results. He avoided the erroneous conclu-

sions which had operated to produce the failure of the previous machines, simplified the parts very materially, and reduced complexities, as far as he could, to a minimum.

To the main frame, Hattersley fastened a type table, containing a metal case in which the types could move freely. "Followers" were arranged in the rear, that pressed the type against a fixed plate by means of a vulcanized india-rubber spring. The last type of a row was depressed by a piston into a guide-plate provided with grooves converging to a single outlet below. As the composition proceeded, a lever pushed the stick forward. The types were placed in the composing stick direct by only one motion. The floor occupied by the machine was two feet by three feet, while the machine was simple and comparatively inexpensive, the price ranging from \$375 upwards.

Distribution was accomplished by placing the types in an inclined galley, the line lowest in the column resting on a sliding bar, having within it a series of loose metal pieces equal in length to the width of the column. The ends of these pieces projected, and when the bar was moved, pushed against the contiguous lower line of type in the galley, thus sliding it into the groove, each piece working upon a separate line. The matter was read as it approached a given point; the operator touched a key on the board before him, and the letter which answered to the key was instantly conveyed to its proper receptacle. By this machine one distributor could supply two setters. The machine worked ordinary type, no special niching being required. By later improvements the distribution was accomplished direct into the channels of the composing machine. This machine was not a success, for the reason that one man can by manual operation easily distribute for five compositors. An ingenious principle was touched upon, but not rendered practicable.

In the "Brown" type setting machine (1870), there were channels set at such an angle that they could slide downward by their own gravity, and rest upon the bar which closed the lower ends. Below, and in front of the machine was the "stick," or mechanical hand, which took the letter from the case. By the depression of a key, its corresponding type was thrust into the stick, and when the stick was filled, it was run to the end of the track into the "justifier." Justification was by hand, the usual method with all machines up to and after this date for many years.

Brown's distributor consisted of a rotating ring about ten inches in diameter. At one side was a galley which received the page to be distributed. Radiating from this were the channels into which the types were distributed, and which, when full, were transferred to the "setter."

Beginning with the year 1822, there were in England thirty-five patents granted on type-setting machines up to the year 1872; and beginning with 1840, and ending at the same time (1872), the United States granted thirty-five patents. Since that time the advance is counted by the hundreds.

Those attracting the greatest amount of public attention are at the present time: the "Fraser" described on p. 701, of Vol. XXIII of the *Britannica*; the "Thorne," the "McMillan," the "Mergenthaler," and the "Rogers." The "Thorne" and "McMillan" use single types, while the others cast in solid lines.

MACKIE'S TYPE-SETTING MACHINE.—This machine, invented in 1869, is divided into two parts, one of which consists of a tiny instrument with fourteen keys, by means of which narrow strips of paper are perforated by hand, either in the printing office,

or elsewhere. The machine proper consists practically of three horizontal rings, and is about 3 feet in diameter, and 2 inches broad, the under ring and the top one being at rest. On the top ring twenty pockets are inserted, each of which contains compartments for seven different kinds of type, and sufficiently open at the bottom to allow the proper apparatus to extract the bottom type from any one, or from all the seven divisions, as wanted. The middle, or traveling ring has twenty "pick-pockets," each carrying seven of what are called "legs-of-man," and seven "fingers." As an initiative there is a drum two inches in diameter, with perforations in the upper surface. Over this drum the paper is made to travel by a positive motion of one-tenth of an inch at every movement. Over the top of the drum and the paper are fourteen levers with pegs ready to enter perforations in the drum, but are only able to enter those which have corresponding perforations in the paper.

One-half of the perforations regulate the "legs-of-man" and the other half the "fingers." On the type being extracted, it remains upon the traveling ring till it has reached the delivery channel, when a pusher places it on a traveling belt from which it is carried down to a syphon spout, one letter upon another, ready for justification. A ring carrying twenty "pickpockets" each with seven fingers, may extract 140 type in one revolution.

The capacity for composition of this machine is rated at 12,000 ems an hour. The perforating is done at the rate of 10,000 ems an hour, and the perforated slips can be used indefinitely. An appliance permits the printing of the proof as fast as the type are set.

THE THORNE TYPE-SETTING MACHINE.—In the "Thorne" Type-setting and Distributing Machine (fig. 9), invented in 1880, there are two principal features, namely, a key board and two vertical cylinders having the same axis, the upper cylinder resting upon a collar above the lower one.

The mechanism, which is simple, consists primarily of two cast-iron cylinders, each 15 inches in diameter, placed one above the other. In the surface of these cylinders are cut ninety longitudinal channels, in depth nearly equal to the length of a type, and corresponding to the body of the type to be used. The channels of the lower cylinder, or "setter," are fitted with wards corresponding exactly with nicks on the edge of the type, no two characters having the same combination of nicks. The upper cylinder is the distributor, and into its channels is loaded type in lines just as it comes from the form, face out, from a special galley.

The operation is very simple and rapid, less than five minutes being required to "load" 6,000 ems of brevier. The distributing cylinder revolves above the "setter" with an intermittent movement, pausing an instant at the points where its channels coincide with those of the lower cylinder. The lowest type in each channel soon finds a combination of grooves corresponding to its nicks, and drops down. It cannot, under any circumstances, go into any but the proper groove; and as the ninety channels coincide or match one hundred and fifty times per minute, the speed of this automatic distribution is equal to 10,000 ems per hour.

Over 8,000 ems can be loaded in and distributed within an hour. Provision is made for taking out surplus type in any channel when an excess of a particular letter or "sort" has accumulated, and for replenishing, when a sort is exhausted before distribution supplies it, the latter, however, being a rare occurrence. These sorts are kept in type-founders' galleys, placed in a cabinet convenient to the machine.

The key-board is like that of a type-writer, except that it is larger and has more keys. Each key is attached by a lever to a plunger, or ejector, which, when a key is depressed, forces out the lowest type in the corresponding channel of the setting cylinder. Each type is pushed out upon a rapidly revolving disk, a short curved guide starting it in the right direction. The disk, whose axis is the same as that of the cylinders, carries the type quickly to the righthand side of the machine, where it is received on an endless belt, which transfers it to a lifting apparatus, or packer, where each successive type is placed in proper position in the line. The marvellous accuracy and nicety of the operation is one of the phenomenal features of the machine. As one type follows another, the line is pushed along across the front of the machine between the key-board and the "setting" cylinder to

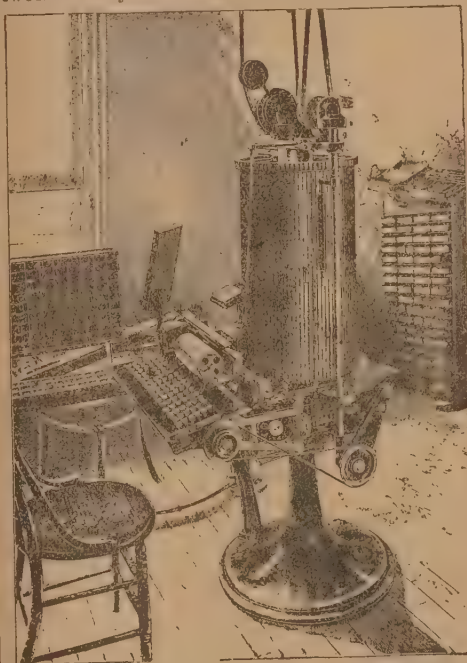


FIG. 9. THORNE TYPE-SETTING AND DISTRIBUTING MACHINE. the justifier, who, with a "grab" set to the required measure, breaks up the long line coming from the "packer."

As each line is justified, a lever operated by the foot pushes the line into the galley. Between the operator and the justifier is placed a double case for sorts, etc., containing on the operator's side italics, reference marks, commercial marks, etc., and on the justifier's side, duplicate sorts of the type played out of the machine. Under this double case, convenient to both operator and justifier, is a third case containing small caps. Any character not played out from the key-board is placed on the disk, which delivers it to the belt, and it is carried into the line the same way as any letter played out from the machine.

In an iron case in front of the justifier are held the spaces required for properly justifying the lines. It is so arranged that one, two, or three of any particular space can be drawn out by a single

motion. The machine is driven by two small belts, one of which transmits power to the revolving disk, packer, and ejector apparatus, and the other, by means of an eccentric shaft operating an index pawl, produces the step-by-step motion of the distributor. Three persons are required to operate the machine—an operator, a justifier, and a boy to “load” the distributor. Proof corrections are made in the ordinary way.

The “Thorne” is adapted for all kinds of book and newspaper composition, with the exception of headlines and display advertisements. All sizes of body type, from agate to pica, are set with equal facility, although any given size of the machine will set only its corresponding size of type. Ordinary type, as it comes from any foundry, is used, but it must be specially “nicked” before its introduction into the machine. The shortest “takes” can be handled as expeditiously on the machine as by hand compositors, a feature which will be especially appreciated on daily newspapers. The speed attained in daily use averages over 4,000 ems an hour of type distributed, set, and justified; but in trials of speed 6,000 ems an hour have been delivered on the galley. The capacity of the machine is dependent solely upon the expertness of the operator. The distribution being automatic is absolutely correct, consequently there can be no typographical errors in proofs if the operator manipulates the keys without fault. The “distribution” and the “setting” go on in the same machine at the same time. A single machine occupies about the same floor space as a compositor's double frame.

THE McMILLAN TYPE-SETTING MACHINE.—This machine, invented in 1883, belongs to the class utilizing gravity as the force for gathering the type to a common center. There are three parts, each independent of the other: The type-setting machine; the distributor, and the justifier. The type-setting machine bears a resemblance to the Frasier, described in Vol. XXIII, page 701 of the Britannica, but an examination will show very radical differences.

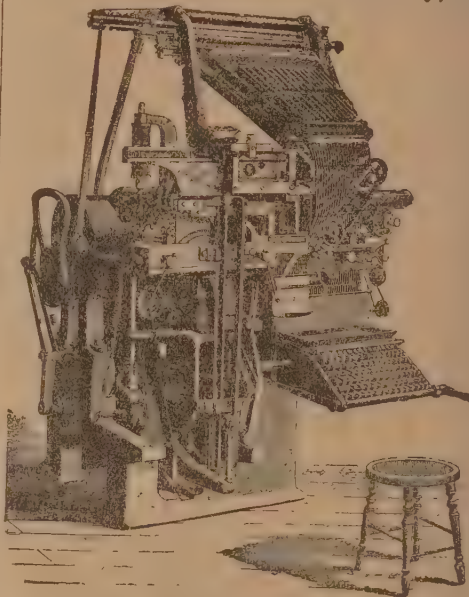
The machine proper occupies about half the space of the compositor's “frame.” The operator sits before a Remington key-board, and works the keys as in the ordinary Remington type-writer. Set above the key-board are four “sections,” each containing twenty brass channels, each about 24 inches in length. These contain the various types. Each “channel” swings on a hinge as a door swings. By the touching of a key the required type is released and drops by gravity into a race, whence it is carried forward to its destination, a peculiarly constructed “storage galley,” where line after line of “set” matter is “stored” for manipulation.

The “storage” galley is rectangular in shape; is about 24 inches in length; will hold from twenty to forty lines, according to the size of the type, and reserve in temporary store 5,000 or 6,000 ems of matter. From this “storage galley” a proof is taken, and when corrected the final justification is made. The “storage” of matter, instead of obliging the justifier to “keep up” with the key-board operator, is a peculiar feature of this machine.

The distributor is distinct from the type-setter. It consists of a disc revolving within a series of “sections” radiating from its outer circumference. The type is fed line after line into the disc channels, while the steady revolution of the disc carries it around, and when the appropriate place for the type is found, as is indicated by the nicks, it is “discharged” into the “channels” severally designated by mechanical appliances. When a “channel” is filled, it is removed and stored on a “channel rack,” an “empty” channel being put in its place. The

proof having been taken from the “storage galley,” nothing remains but the final justification into line measure, which is done on a machine with one operator, when the matter is ready for the form.

A REVOLUTION IN TYPE-SETTING.—Type setting has been conducted substantially for four hundred years by hand. Each letter has been picked up by itself, and placed in the stick, marshalled with others into lines, and then again into columns. The compositor's portion of the art has made little, or no change in the method, although he is rich in appliances. The problem of composition, and attendant distribution, of type L₇ machinery has, for forty years past, absorbed more brains and money than almost any other problem with which inventors have struggled. Comparatively it is not a very difficult task to set type by machinery; the



THE MERGENTHALER “LYNOTYPE.”

distribution is more difficult; and the justification is the most difficult of all.

The objects sought by inventors are to do away with the use of movable type in printing, to reduce to a minimum the cost of composition, and to dispense with the labor and cost of distributing type, which is a necessary item in any printing office.

The most difficult of all the problems to be conquered, however, is the automatic justification of the lines—that is, equal spacing of the words constituting the line of printed characters. The difficulty of accomplishing this task will be apparent when it is remembered that the compositor at the machine cannot tell, until his line is full, either the size or number of the spaces that will be needed; hence this problem has proven a great stumbling block in the path of the inventors, and, as a consequence, with few exceptions, they have contented themselves with the production of machines that will set and distribute type, and have left the justification of the lines to be done in the old way—by hand.

The great difficulty about justification arises from the fact that the size of the spaces required is not known until the line is set. The hand com-

positor goes back over his line and changes the spaces as may be necessary to justify. There is no easy way to imitate this by machinery. As the spaces cannot be of greater body than the type, or even as much as "type high," it has been impracticable to use expandable spaces.

While all the machines previously mentioned in the progress of the evolution of printing mechanics, were improvements on the old method of type setting, yet there was not in any one of them anything like a revolutionizing tendency. The slight gain was met by the greater expense, and the constant liability to get out of order. It was reserved for the "Mergenthaler" and the "Rogers" machines to open the way for a complete and radical change in the matter of newspaper and book composition. Types are really unknown in these machines, the solid and perfectly justified line taking their place.

To Ottmar Mergenthaler, of Baltimore, belongs the credit of utilizing the many brilliant thoughts of inventors in this field. His inventive genius, has produced a machine (fig. 10) which accomplishes all that is claimed for it. Patents were granted in 1885, and were rapidly followed by others. He has also secured by purchase and otherwise, many brilliant suggestions patented by others.

Mr. Mergenthaler conceived the happy idea of setting up a line of matrices, and using expandable spaces operated automatically. After the line of matrices is set up and automatically spaced so as to justify, he casts against this mold a linotype (of type metal) which is the exact equivalent of a solidified line of type containing the same characters as the matrices set up. Freed from the restrictions imposed when using type, he can make the matrices of whatever size and material the purpose requires.

The matrices in the "Linotype" are made of brass. In shape, they are circumscribed by a parallelogram, and are an inch and a quarter long by three quarters of an inch wide. The thickness of the matrix corresponds with the width of the letter, thick for an "m," thin for an "i" or an "l."

The character is stamped on the side edge of the matrix, the depth corresponding to the shoulder on the type, and is about one-third the distance from the bottom of the matrix. These matrices are stored in what may be likened to a toboggan slide, shown at the upper right hand of the cut. It is composed of two parallel plates separated by five-eighths of an inch and containing grooves in their opposing faces. These plates are set at a steep incline. The matrices lie with their side edges engaged in the grooves. Each set of grooves (one at the top and one at the bottom), contains the matrices for only one character. At the lower end of each set is an anchor escapement, connected indirectly to a key on the key-board. When a key is depressed it operates the escapement so as to allow the bottom matrix to escape by force of gravity from the grooves, and fall to a traveling belt which urges it to the left toward the assembling point. The other matrices in the groove slide down the distance of one matrix.

The spacing devices, which are made of steel, are about 4 inches long by $\frac{1}{8}$ of an inch wide. They are in two parts, fitted by a dove-tailing process, a long piece sliding on a short piece. They form double wedges, the outer faces being parallel. The spacing is effected by releasing, one by one, at the end of each word, a wedge-shaped bar, a series of which are stored in a separate magazine, from which they are discharged into the receiver in a manner similar to that in which the matrices are fed.

It is this peculiar spacing feature that has been heretofore regarded as one of the impossibilities in the construction of a machine that could take the place of hand-justifying, but the simplicity of the wedge, the ease with which it falls into place, and the certainty of a correct spacing, has been so thoroughly accomplished, that the wonder is that it had not been thought of before. The wedges are about 3 inches in length, and, while the thin part only is first inserted by the space key at the proper places, the whole series will be, by the touching of another key, driven to just the right pressure for the complete and even justification of the line.

The first possibilities of such a procedure were born in the brain of Merrit Galley, of New York, who built a machine and secured the necessary letters patent in 1872. The wedging space-bar was wholly original with him, and he is the pioneer in the revolution of type setting, which for four hundred years had seen no appreciable change. The Galley space-wedge was first a pair of plain wedges playing on each other; then, to give a better alignment, a shouldering feature was introduced, whereby a perfect pressure between the type or matrices was secured, and the justification made perfect.

In the original machine electrical connections were made, so that what was done on one machine could be repeated on as many machines as were put in connection with the original worker. Thus, a machine at Washington, with one operator, could report proceedings in New York, Boston, Philadelphia, Chicago, San Francisco, etc., and cast the lines of type, all under the manipulation of the single operator in Washington. Mr. Mergenthaler caught at the idea, and devoted his energies to making it practical. He has succeeded very largely, and the Mergenthaler "Linotype," with its rival, the Rogers "Typograph," has begun a radical revolution in the work of composition.

To correct a mistake, or for any other reason, the operator can by hand and with facility transpose, change, add to or subtract from the line, any matrices.

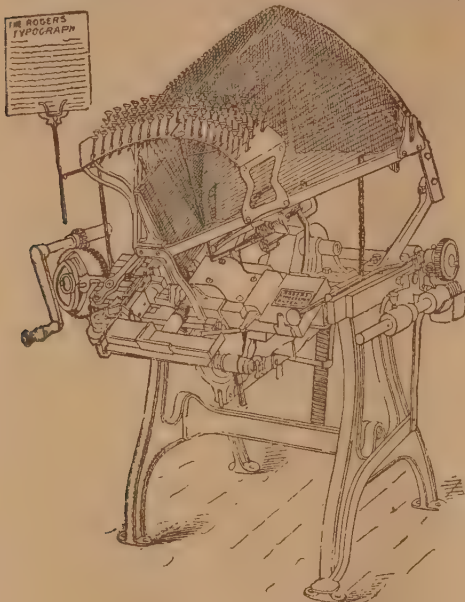
By an easy short movement of the hand lever, the completed line is started over to the casting mechanism. A pair of rails fastened to a vertically sliding frame carries the line of matrices down between two metal jaws projecting from a plane face of iron. These jaws close to the exact pressure or length of line. A cross-bar below rises and strikes the bottoms of all the long sliding pieces of the justifying spaces, forcing them in their wedge form further into the line, and so widening all the spaces until the line fills the distance between the jaws. Thus is accomplished the act of justification.

The mold is made of hardened steel, and is the segment of a cast-iron disc 14 inches in diameter, capable of rotation, and carried on a frame that slides in the direction of the axis. This mold advances and aligns the line by pressing it against the fixed plane surface behind the matrices, the stamped characters just meeting and closing the opening at the front face of the mold. The pot containing the melted type-metal, follows behind the mold, and closes the opening at the back face. The hot metal is injected from a row of holes in the pot into the mold, and, when chilled, the pot, mold, and line of matrices are separated. The cast linotype is ejected, having passed by and between knives so as to have it machine-finished to exact size, and placed on a galley.

The sliding frame raises the line of the matrices up to the height of the space box; an arm comes down from above, separates the brass matrices from the spaces, allowing the latter to slide en masse into their box, and carries the matrices up

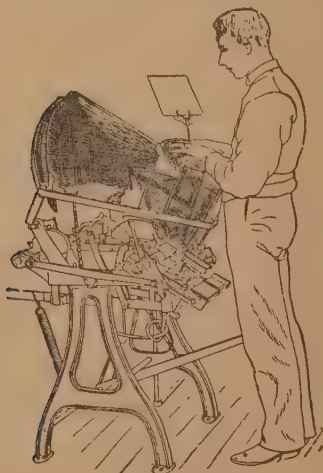
to the top, where they are fed by a simple arm, vibrating, into the distributor.

THE DISTRIBUTION.—To explain the distribution it must be said that a large V is cut in the top edge



THE ROGERS TYPOGRAPH.

of each matrix. This V is serrated with seven teeth on each side, that is, originally. The distributor bar is horizontal, of steel, shaped at its bottom



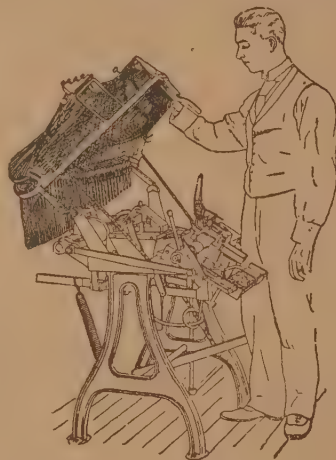
ASSEMBLING THE MATRICES.

edge to correspond to the serrated V of the matrix. The matrices are fed onto this bar and are supported by their engaged teeth. As they hang from this bar, they are urged to slide along by conveyer screws, and are driven through a set of passages leading to the toboggan slide previously mentioned. These passages are distant $\frac{1}{4}$ of an inch from cen-

tre to centre. The teeth on the bar are cut away in sections, so that at every $\frac{1}{2}$ of an inch there is a different combination of teeth left full on the bar. Certain of the teeth on the matrices are also cut away, the combination being the same for all of any one character, and different from any other characters.

So long as there is on the matrix one pair of full teeth corresponding to a pair of full teeth on the bar, the matrix is supported, but when it arrives at a point on the bar over its appropriate passage, there are no teeth on the bar and matrix corresponding, hence, nothing to support the matrix, and it drops into its passage and slides from there into the toboggan groove. As those in advance of it in the groove are used, it follows down, and finally becomes the bottom matrix once more, and starts over the same circuit again.

There are ninety keys on the key-board. There are also other characters, such as are not used



DISTRIBUTING THE MATRICES.

frequently, kept on a convenient frame, which can be readily inserted by hand. Blank matrices are used as "quads."

Any size type from agate to small pica, inclusive, will run in the same grooves, so that any of the included fonts may be used in one machine. The machine can also be changed to any reasonable length.

As soon as one line is completed and started to the castor, the operator proceeds to set up another line. The keys are operated like type-writer keys. The operator has nothing to do but to manipulate the keys and start the line. The capacity of the machine is from 8,000 to 10,000 ems per hour.

The moment the linotypes leave the machine they are ready to go into the form without any second operation. New type is obtained for each issue. The spacing in any one line is uniform. After a line is once set up, the casts from it may be repeated as often as desired at the rate of six a minute. The lines being solid, there is no piling. Leads are inserted at the pleasure of the maker-up of the forms. The old style hand-distribution does not exist, as the linotypes are melted over, when they have served their purpose. The metal is kept hot by Bunsen gas flames consuming a total of about fifteen feet of gas per hour. The space occupied by each machine is five feet by five feet, and its weight is about 2,000 pounds. With

the single exception of touching the keys by the operator, every operation of the machine is automatic. The "Linotype" (condensed from 'line-of-type') gives a solid and perfectly justified line, which is the central principle of the invention. It is a radical departure from any previously known methods, and its general acceptance by the newspaper and book-making world is a proof of its success as a revolutionizer in the art of printing.

THE ROGERS TYPEGRAPH.—The Rogers Typograph named after the inventor, John R. Rogers, while it has certain features in common with the Mergenthaler is yet in many other features radically different. Its size is about four feet by four feet on the floor space, and it is four feet, six inches in height. Its weight is 450 pounds. The floor space occupied by it is little more than that taken up by an ordinary sewing-machine. It can be run by foot, hand or machine power, only one-eighth horse power being required. The speed of the machine is limited only by the capacity of the operator. On a sixteen-em pica line, a speed of 7,000 ems per hour has been attained.

The Typograph is simple in construction, and the matrices from which the type is cast, slide into their places by gravity. The finished product of the machine is a solid line of type ready to be placed in the *form* to be printed from directly, or to be used for stereotyping. The lower half of the Typograph contains the receptacle for the melted type-metal, the casting box, and the machinery for trimming the line of type. Above this and connected with it, is the frame upon which the matrices are hung. This frame is like a rounded arch, with a steel wire devoted to each matrix in a foot of type.

The matrices are strips of brass dangling at the back side of the machine. In the steel side of each is cut the perfect impression of the printed letter from which the type is to be made. At the upper end of each stretched wire in the frame hang several matrices containing a given letter, but each wire contains a different letter.

The dangling matrices are so attached at the top of the wires, that when released, they slide along the wires downward one at a time at an incline of about forty-five degrees into line-form position. There is no disarrangement, as no matrix ever leaves its own wire, and it is sent back to its place when the line is completed by simply lifting the wire-frame. When the matrices are gathered into line, the spacing is accomplished by the rotation of a rocking disc of circular form which at the initial point is thinner than a three-em space. The touching of the space key throws one of these discs into position at the end of each word.

When the line of matrices is assembled, the touch of another key causes the discs to revolve to the necessary point of pressure which indicates that the line is full. Pressure on a foot treadle is given, when the casting and delivery of the line is made in about two or three seconds.

The key-board is about one foot wide, and the stiff wires, as they emerge from under it, cover about the same space. These wires then spread out and extend upward and outward, so that at the end from which the matrices hang, they form almost a semi-circle, with the diameter parallel with the edge of the key-board. This gives all the wires an upward slant.

A black pipe, whose mouth protrudes from the hot flame of a gas jet, or a lamp, or whatever may be used, preferably a Bunsen burner, connects with an iron box which is filled with molten type metal. This is so arranged that when a rod in the back of the machine revolves, it forces a stream of

the molten material through small apertures in the pipe against the matrices, and the line is formed in a single solid piece, as in the Mergenthaler machine.

In operation, after the line is set, by touching a pedal, one revolution of a wheel forcing the flowing metal into the casting box, makes the line of type before it solidifies, and then sends it between a pair of knives which trim it into proper shape. The key-board is then raised by the operator, and the matrices slide back to their places at the upper end of the wires by force of gravity. The frame is lowered again, and the operation of "setting" is continued. A circular stand on one side of the machine contains matrices for characters seldom used. These can be rapidly inserted by hand, so that italics, rare commercial characters, etc., may be used when necessary.

The advantages which these machines, and the Mergenthaler type-setter will work to publishers, to compositors, and to the public at large are almost incalculable. The publisher can give his paper a new dress every day, for there are no type to be worn out, or become nicked, no dots upon the i's broken off, no commas bruised into periods, no f's converted into mongrel t's, and there is no incomplete or improper spacing. There can be no pi-ing under any circumstances, for every line is solid. It is also cheaper to have extra sets of matrices than to carry extra fonts of type. It is possible to obtain any unexpected million ems of composition without having to wait for type, and to lock up any number of matrices without losing interest on expensive type, and with the ability to put the whole affair into the melting pot when desired, thus closing the interest account for the type metal.

Thousands of small towns which have not been able to support even a weekly newspaper, can now boldly enter upon the support of a daily, without risk to the publisher. This feature alone will cause an increase in the amount of composition done, over what a compositor can do by hand; thus paying employment will be found for every one capable of running a machine. Compositors and proof readers will also find the machines giving proofs that do not injure the eyesight, particularly where the type is small, or where a complicated face, as in German, is used.

PRISON DISCIPLINE. See *Britannica*, Vol. XIX, pp. 747-764.

Up to the present century the typical prisons were the Bastille in Paris, the Tower in London, the Plombs in Venice, the Mamertine at Rome, the Spielberg in Austria, and the dungeons of the Inquisition in all Catholic countries. The management of these prisons was organized and systematic cruelty. Most prisons were dark and damp; cold in winter, and the Plombs insufferably hot in summer; the prisoners were usually half-starved, and clad in rags; often loaded with chains, and oftener yet pestered by rats.

Penology is the science and art of proper punishment. It is a practical science, and has been originated by John Howard, a retired London merchant. He investigated many prisons in Europe and America. He began his work in 1773.

In 1776 the first Prison Reform Association was organized in Philadelphia. It was called "The Philadelphia Society for Assisting Distressed Prisoners." Benjamin Franklin was one of its first members. This society recommended "The classification of prisoners, and individual reformation with labor in seclusion, and the interdiction of all intoxicating drinks." The legislature of Pennsylvania passed an act in 1790, in which the principle

of separating the prisoners was recognized as far as hardened offenders were concerned. In 1794 this act was amended so as to require the separation and seclusion of all convicts. The death penalty was abolished in all cases except for murder. In 1829 the Eastern Penitentiary of Philadelphia was built. This prison soon became famous. It was imitated in many countries. In this institution the solitary confinement of prisoners, known as the "Pennsylvania System" was for the first time put into operation, every prisoner being confined in a separate cell. It is now only in practice for prisoners awaiting trial, but not for convicted felons.

The first prison in America which adopted the Philadelphia system, was that at Auburn, N. Y., which introduced it in 1830. But no employment was provided for the prisoners at Auburn, the cells there being too small to permit such employment. The result was the early abandonment of the Pennsylvania system at Auburn. In its place labor in association by day was provided for the prisoners and solitary cellular confinement at night. This soon became known as the "Auburn" or "congregate system," and is still so recognized. After trying the Pennsylvania system in many prisons, especially at Sing Sing, N. Y., at Thomaston, Me., at Providence, R. I., at Trenton, N. J., and at the Western Penitentiary of Pennsylvania, at Allegheny, it was soon abandoned and replaced by the Auburn system. Since then the latter system has been universally adopted in American penitentiaries.

In the South the "lease system" has been introduced after the civil war. Upon the liberation of 4 million slaves in the Southern States there were so many of them convicted for stealing, that sufficient room for their confinement could not be found in the existing prisons. In order to dispose of them they were leased out to the highest bidders for the term of their respective sentences. The lessees were to have the entire control of the prisoners, and for this privilege they were to maintain them and pay the State a stipulated price *per capita*. This system is a modification of slavery, with the dangerous adjunct that the master has no property interest in his slaves. Nothing hinders him to be cruel to the prisoners to get more work out of them. The system is against the humanizing spirit of the present civilization. It exists at present in the States of Georgia, Florida, Tennessee, Mississippi, Arkansas, and Louisiana.

In 1815 the "Society for the Improvement of Prison Discipline and for the Reformation of Juvenile Offenders" at Boston was organized, and in 1824 it was followed by the organization of "The Boston Prison Discipline Society." Through the influence of these two societies the reformatory for men at Concord, Mass., the prison for women at Sherborn, Mass., and the Suffolk county jail at Boston became models for the treatment of prisoners, especially in the absolute separation of all prisoners awaiting trial, and in the reformatory endeavors regarding all convicts.

In the State of New York the "House of Refuge" was opened in 1825, and is still in operation at Blackwell's Island. It was the first reformatory for juvenile delinquents in the United States, and was the work of the "Society for the Prevention of Pauperism," established in 1818, and reorganized in 1823 as the "Society for the Reformation of Juvenile Delinquents." The reformatory prison at Elmira, N. Y., in 1877 is another forward step in prison management. It is now the model prison of the world in its methods of dealing with felons under 30 years of age convicted for their first of-

fence. The prisoners at Elmira are segregated into 3 classes under the mark system; their sentences are mostly indeterminate, depending greatly on good or bad behavior; and the prisoners after being trained in some branch of industry, are often discharged conditionally, that is, under supervision. New York was also the first State in the Union to establish a hospital for the custody of insane criminals, which has been in operation at Auburn since 1858.

In 1844 the "New York Prison Association" has been organized. This society exerted a wide influence in all matters pertaining to prisoners in the United States. By its efforts the "National Prison Association" was formed in 1870, and also the International Prison Congress in 1872. Both of these have contributed very largely to the advancement of prison reform, and are still in active operation.

In Ohio, jails are provided which secure the absolute separation of all prisoners awaiting trial; also district workhouses for misdemeanants; and an intermediate penitentiary for young men under 30 years of age convicted of felony for the first time, the latter institution being at Mansfield, while life-prisoners and incorrigibles are kept at the Columbus penitentiary.

For delinquent children Ohio first established reformatories, upon the family or cottage system. The first of these was for boys, at Lancaster, in 1858, and the second for girls at Delaware in 1878. Ohio has also taken the lead in establishing a system of paroles for penitentiary prisoners, and also in making a third conviction for felony conclusive evidence of incorrigibility, and subjecting the offender to imprisonment for life.

Through the influence of State boards of correction and charity, and the activity of the national and local prison associations, manifested by conferences and publications, there has been a revival of public interest in the United States upon prison subjects, and annual improvements are indicated by the enactment of reformatory laws in almost every State. There is also a growing sentiment all over the Union in favor of separate prisons for women, which are to be entirely managed by women. Beside the prison for women in Sherborn, Mass., there is another female prison in operation at Indianapolis, Ind., and others are contemplated in several of the larger States.

In the United States there are no prisons owned and controlled by the federal government except a few territorial jails and the militia prison at Fort Leavenworth, Ks. Prisoners convicted of felonies under the United States laws are confined in such State penitentiaries as may be designated by the Attorney-General of the United States, under agreements with State authorities. Over these State penitentiaries the general government has no control. This state of affairs ought to be changed by the establishment of a federal penitentiary.

NUMBER OF CONVICTS IN PENITENTIARIES IN THE UNITED STATES IN 1890. — The table herewith submitted shows the total number of convicts in penitentiaries to be 45,233. The number reported in 1880 was 30,659, but the increase in the population of penitentiaries is not so great as would appear from a comparison of these figures, since a different rule of classification has been adopted. In the tenth census 4,879 prisoners in some of the southern States, who were leased out and not confined within prison walls, were separated from the penitentiary population. For instance, in Georgia, which has no penitentiary of its own, 1,504 leased prisoners were not counted

among penitentiary convicts though nearly all of them might have been properly so classed. The same remark applies to the State of Florida. In the statement herewith submitted 9,561 leased prisoners are included, because they were serving sentences in the penitentiaries of the States in which they were found. It cannot now be ascertained how many of the 4,879 leased prisoners in 1880 were serving penitentiary sentences and how many of them were serving short terms for minor offenses in county convict camps, but it is certain that a large majority of them, probably nine-tenths, were penitentiary convicts. The percent-

age of error will be so slight that it is safe to say the number in penitentiaries in 1880 was 35,538, but in 1890, as above stated, it was 45,233—an increase in ten years of 9,695, or 27.28 per cent. The increase in the total population was 24.86 per cent. It thus appears that the penitentiary population is growing somewhat more rapidly than the population at large, but the difference is not very appreciable. The number of leased prisoners in the South has almost doubled in ten years.

The tables on this page and the next exhibits the distribution of penitentiary convicts in 1890 by States and Territories and nativity and race:

PENITENTIARY CONVICTS OF THE UNITED STATES IN 1890, BY STATES AND TERRITORIES.

States and Territories.	Aggregate.	White.							Colored.	
		Total.	Native.				Foreign Born.	Nativity Unknown.		
			Total.	Parents Native.	One parent foreign.	Parents foreign.				One or both parents unknown.
The United States....	45,233	30,546	23,094	12,842	11,747	6,584	51,921	7,267	185	41,687
NORTH ATLANTIC DIVISION.....	14,477	13,324	9,435	3,960	791	3,993	691	3,780	9	11,253
Maine.....	170	170	133	82	11	23	17	36	1	
New Hampshire.....	116	116	82	58	7	17		34		
Vermont.....	91	91	74	43	10	13	8	16	1	
Massachusetts.....	1,530	1,457	1,072	397	107	527	41	385		273
Rhode Island.....	122	111	87	59	11	34	3	24		11
Connecticut.....	340	303	221	114	10	83	14	80	2	37
New York.....	8,190	7,583	5,302	1,959	431	2,401	511	2,280	1	7,697
New Jersey.....	1,557	1,380	885	413	47	420	6	445		227
Pennsylvania.....	2,361	2,063	1,579	856	157	475	91	480	4	2,298
SOUTH ATLANTIC DIVISION.....	6,466	1,204	1,112	891	47	87	87	87	5	75,262
Delaware.....	(i) 690	286	246	139	21	59	27	48	2	394
Maryland.....	(f) 1,179	206	195	176	4	5	10	10	1	961
District of Columbia.....	278	194	186	136	7	14	29	8		84
Virginia.....	1,422	235	230	218	9	3		5		1,187
West Virginia.....	806	56	54	51	1	2		1		751
North Carolina.....	1,729	167	161	151	5	4	1	6		1,562
South Carolina.....	374	51	49	20			20	9	2	323
Florida.....										
NORTH CENTRAL DIVISION.....	10,990	9,261	7,478	4,575	594	1,570	739	1,760	23	11,729
Ohio.....	1,652	1,332	1,148	678	70	267	133	183	1	1,320
Indiana.....	1,416	1,230	1,117	855	73	138	51	95		196
Illinois.....	2,057	1,799	1,361	751	132	378	110	433	5	1,928
Michigan.....	1,108	1,045	765	405	83	188	109	368	2	663
Wisconsin.....	530	507	311	149	35	117	10	195		233
Minnesota.....	432	416	258	127	24	76	31	156	2	16
Iowa.....	623	577	487	289	50	88	60	89	1	46
Missouri.....	1,701	1,140	1,004	558	83	180	183	184	2	950
North Dakota.....	65	62	39	15	4	16	4	23		3
South Dakota.....	97	92	66	36	5	21	1	25		75
Nebraska.....	391	350	269	239	7	9		80		341
Kansas.....	918	721	633	459	35	92	47	87	1	1,197

a Includes 707 convicts with a native father and foreign-born mother and 1,040 convicts with a native mother and foreign-born father.

b All white, and all natives of the United States.

c As reported by the enumerators, these figures include 10,889 pure negroes, 3,373 mulattoes or negroes of mixed blood, 240 Chinese, and 180 Indians.

d Includes 6 Chinese and 11 Indians.

e Includes 4 Indians.

f Includes 4 Chinese and 7 Indians.

g Includes 2 Chinese.

h Includes 2 Indians.

i Delaware has no penitentiary.

j There is no penitentiary in the District of Columbia.

k Includes 2 Indians.

l Includes 5 Chinese and 39 Indians.

m Includes 13 Indians.

n Includes 4 Chinese and 1 Indian.

o Includes 1 Indian.

p Includes 1 Chinese and 10 Indians.

q Includes 1 Indian.

r Includes 4 Indians.

s Includes 2 Indians.

t Includes 7 Indians.

PENITENTIARY CONVICTS OF THE UNITED STATES IN 1890, BY STATES AND TERRITORIES—*Concluded.*

States and Territories.	Aggregate.	White.							Colored.	
		Total.	Native.					Foreign Born.		Nativity Unknown.
			Total.	Parents Native.	One Parent Foreign.	Parents Foreign.	One or Both Parents Unknown.			
SOUTH CENTRAL DIVISION	9,241	3,271	2,609	1,971	123	241	274	518	14 ^a	65,970
Kentucky	1,235	515	367	293	12	30	32	26	122	730
Tennessee	1,484	402	359	266	14	26	53	34	9	1,082
Alabama	1,086	159	148	133	7	6	2	11		927
Mississippi	429	39	38	27		3	8	1		390
Louisiana	856	129	108	48	16	32	12	21		727
Texas	3,319	1,704	1,278	960	57	130	131	414	12	61,615
Indian Territory.	(d)									
Oklahoma	(e)									
Arkansas	832	323	311	244	17	14	36	11	1	5,509
WESTERN DIVISION	4,059	3,586	2,460	1,445	193	698	130	1,122	4	9,473
Montana	225	205	152	88	5	59		52	1	1,230
Wyoming	10	9	8	3	2	2	1	1		1
Colorado	526	488	368	193	39	109	27	120		38
New Mexico	112	109	80	59	5	6	11	27	2	3
Arizona	144	117	51	30	4	14	3	66		727
Utah	180	174	99	48	3	25	18	75		76
Nevada	96	75	41	26	3	12		34		621
Idaho	102	94	58	30	12	9	7	36		18
Alaska	(m)									
Washington	251	224	152	81	10	55	6	72		227
Oregon	362	322	241	158	4	51	28	81		640
California	2,051	1,769	1,210	799	100	352	29	568	1	12,282

^a Includes 2 Chinese and 35 Indians.^b Includes 1 Chinese and 1 Indian.^c Includes 1 Chinese and 3 Indians.^d There is no penitentiary in the Indian Territory.^e There is no penitentiary in Oklahoma.^f Includes 32 Indians.^g Includes 237 Chinese and 92 Indians.^h Includes 6 Chinese and 10 Indians.ⁱ Includes 4 Chinese and 17 Indians.^j Includes 1 Chinese and 5 Indians.^k Includes 10 Chinese and 1 Indian.^l Includes 4 Chinese and 2 Indians.^m There is no penitentiary in Alaska.ⁿ Includes 3 Chinese and 10 Indians.^o Includes 25 Chinese and 5 Indians.^p Includes 171 Chinese, 3 Japanese, and 42 Indians.

In respect to color, this table shows 30,546 white and 14,687 colored; of the latter, 15,267 were negroes, 237 Chinese, 3 Japanese, and 180 Indians.

Of the negroes, 3,378 are reported to be mulattoes or persons of mixed blood. This enumeration is probably very inexact, for some enumerators made no attempt to discriminate between the two classes, and there is reason to believe that in some instances negroes of a light brown or chocolate tint have been improperly described as mulattoes.

As was to be expected, about four-fifths of the negro convicts were found in the South Atlantic and South central divisions.

The Chinese were distributed as follows: Arizona, 4; California, 171; Idaho, 4; Illinois, 4; Louisiana, 1; Montana, 6; Nevada, 10; New York, 4; Oregon, 25; Pennsylvania, 2; Texas, 1; Utah, 1; Washington, 3; Wisconsin, 1.

The 3 Japanese reported were all in the California State prison at Folsom.

The Indian were distributed as follows: Arizona, 17; Arkansas, 32; California, 42; Idaho, 2; Illinois, 1; Kansas, 7; Louisiana, 1; Massachusetts, 4; Michigan, 1; Missouri, 1; Montana, 10; Nebraska, 2; Nevada, 5; New York, 7; North Carolina, 2; Ohio, 13; Oregon, 5; South Dakota, 4; Texas, 3; Utah, 1; Washington, 10; Wisconsin, 10.

It will be observed that there is no State prison or penitentiary in Delaware, the District of Columbia, the Indian Territory, Alaska, or Oklahoma. In Florida and Georgia there are nominally penitentiaries, and convicts are sentence to them; but in fact these States neither own nor occupy grounds

or buildings for this purpose, and all such convicts are leased to private parties.

In respect of nativity, not including the colored convicts, who may all be supposed to be natives except the Chinese and Japanese, of the 30,546 white convicts 23,094 are native born, 7,267 foreign born, and the place of birth of 185 is unknown. Before the present census this is all that could have been said on this important topic. But an examination of the table will reveal the fact that the native white convicts are divided into four or really five sub-classes, as follows: 12,842 had both parents native; 1,747 had one parent native and one parent foreign born; 6,584 had both parents foreign born; and in 1,921 cases the birthplace of one or both parents is unknown. Of the convicts with one foreign-born parent 707 had a foreign-born mother and 1,040 had a foreign-born father. Leaving out of view the 1,921 whose parentage is unknown in whole or in part, there remain 21,173 cases in which the proportion of native and foreign blood can be estimated. If to the 12,842 native convicts born of native parents is added one-half of the number with one parent foreign born, the sum is 13,715.5. If to the 6,584 native convicts born of foreign parents is added an equal amount, the sum is 7,457.5. But to this latter figure must also be added 7,267 foreign-born convicts, which gives as a result 14,724.5. In other words, the foreign population of 'his country contributes, directly or indirectly, in the persons of the foreign born or of their immediate descendants, considerably more material for our State prisons and penitentiaries than the ex-

fire native population, the difference being represented by 1,009. This makes a very different showing from that in any former census, and it is nearer correct.

It is an interesting remark, easily retained in the memory, that of 43,127 penitentiary convicts whose birthplace and parentage are known the foreign-born element of the population furnished 14,725, the colored population 14,687, and the native white population, which probably out numbers them both, only 13,715. In other words, each of these elements furnishes about one-third of all the inmates of our State prisons and penitentiaries.

It is also interesting to notice how remarkably the penitentiary population divides itself into three approximately equal parts by geographical lines: the North Atlantic division reports 14,477, the South Atlantic and South Central divisions 15,707, and the North Central and Western divisions 15,049.

The numerical order of the States, according to the number of convicts in penitentiaries reported in each of them, is as follows: New York, 8,190; Texas, 3,319; Pennsylvania, 2,361; Illinois, 2,057; California, 2,051; Georgia, 1,729; Missouri, 1,701; Ohio, 1,652; New Jersey, 1,557; Massachusetts, 1,530; Tennessee, 1,484; North Carolina, 1,422; Indiana, 1,416; Kentucky, 1,235; Virginia, 1,167; Michigan, 1,108; Alabama, 1,086; Kansas, 918; Louisiana, 856; Arkansas, 832; South Carolina, 806; Maryland, 690; Iowa, 623; Wisconsin, 530; Colorado, 526; Minnesota, 432; Mississippi, 429; Nebraska, 391; Florida, 374; Oregon, 362; Connecticut, 340; West Virginia, 278; Washington, 251; Montana, 225; Utah, 180; Maine, 170; Arizona, 144; Rhode Island, 122; New Hampshire, 116; New Mexico, 112; Idaho, 102; South Dakota, 97; Nevada, 96; Vermont, 91; North Dakota, 65; Wyoming, 10.

In respect to sex, 43,442 penitentiary convicts are men and 1,791 are women. The percentage of women is somewhat less than it was ten years ago. It then slightly exceeded 4.5 per cent. of the total number, but now it falls a trifle below 4 per cent.

PRIVATEER, an armed vessel, owned by private parties, who are subjects of a belligerent power. The sovereign of that power can commission the vessel on an errand either in war or of marque in time of peace. See *Britannica*, Vol. XIX, p. 764.

PROA, commonly known as the "flying proa," is a peculiarly-shaped canoe in use by the natives of the Eastern Archipelago, and especially by the Ladrone pirates. It is about thirty feet in length by three in width, and has the stem and stern equally sharp, so as to sail backward or forward without being turned around. The pirates use these canoes to good advantage in their numerous invasions.

PROCTOR, RICHARD ANTHONY, an English astronomer, born at Chelsea in 1837, died in New York in 1888. He was educated at London and Cambridge; published numerous very popular works on astronomy, including *Saturn and its System* (1865); *Gnomonic Star Atlas* (1866); *Half Hours with the Telescope* (1868); *Half Hours with the Stars* (1869); *Other Worlds than Ours* (1870); *A Treatise on the Cycloid* (1878); *Chance and Luck* (1887), and others mostly on scientific subjects. He visited America several times on lecturing tours, and in 1886 determined to remain in the United States.

PROFESSOR, an officer in a university, whose duty it is to instruct students or read lectures on particular branches of learning. The word professor is occasionally used in a loose way to denote generally the teacher of any science or branch of

learning, without any reference to a university. It has been assumed as a designation not only by instructors in music and dancing but by conjurers.

PROHIBITION PARTY. See **POLITICAL PARTIES** in these Revisions and Additions.

PROLETAIRES, a term used by the French to denote the lowest and poorest classes of the community. It is derived from the Latin *proletarii*, the name given in the census of Servius Tullius to the lowest of the centuries.

* **PROPHET**. See *Britannica*, Vol. XIX, pp. 814-823.

PROPLEURA, a genus of extinct tortoises from the *Cretaceous* of New Jersey, type of a peculiar family, which combines the characters of marine and fresh-water forms in the structure of the limbs, and has, in addition, one or two more pairs of costal bones.

PROPOLIS, a substance used by bees in the construction of their combs, to give to the fabric a strength which it could not have if made of wax alone. It is also used for closing up chinks of the hive. It is a resinous unctuous substance, of a reddish brown color, a somewhat bitter taste, and an agreeable aromatic odor, and is collected from the buds of trees.

PROSODY is the name given, both by the ancients and moderns, to that part of grammar which treats of the rules of rhythm in metrical composition.

PROTECTION. See **TARIFF**, in these Revisions and Additions.

PROTECTOR, a title which has sometimes been conferred in England on the person who had the care of the kingdom during the sovereign's minority.

PROTEUS, a name given by many naturalists to certain animalcules remarkable for changefulness of form.

PROTOHIPPIUS, a genus established by Leidy for species of extinct horses found in the Miocene strata of North America, having some dental characters of the younger stages of Equus. Found also in South America.

PROVIDENCE, a city of Rhode Island, one of the capitals of the State, the county-seat of Rhode Island county, and a port of entry. Population in 1890, 132,099. See *Britannica*, Vol. XIX, p. 883.

PROVINCETOWN, a village of Massachusetts, at the northern end of Cape Cod, about fifty-five miles east of Boston by water. It is an important center of the cod-fishing and mackerel-fishing industries. Population in 1890, 4,642.

PROVO, a city, the county-seat of Utah county, Utah, on the Provo River, three miles east of Utah Lake. It is the trade-center of a rich farming region, and an important manufacturing and shipping point for flour. Population in 1890, 5,153.

PROVOOST, SAMUEL, the first Protestant Episcopal bishop of New York, born in New York City in 1742, died in 1815. He became rector of Trinity Church in 1783; was consecrated in 1787; became chaplain of Congress in 1785, and of the Senate in 1789.

PRUSSIA, KINGDOM OF. For general article on PRUSSIA, see *Britannica*, Vol. XX, pp. 1-19. The area of Prussia is officially reported as 136,075 English square miles. The population in 1885 aggregated in the fourteen provinces, 28,318,470. The average density per square mile was 208.1. The area at the close of the reign of Friedrich I., king of Prussia, was about 43,400 square miles; in 1797 the area was 118,000 square miles; from 1806 to 1867, 108,100; from 1867, 136,075.

Of the total population, 45 per cent. in 1885 lived in towns. The population included 13,893,604, males and 14,424,866 females.

AREA AND POPULATION BY PROVINCES.

Provinces.	Area in Sq. Miles.	Pop. 1885.
East Prussia (Ostpreussen).....	14,446	1,959,475
West Prussia (Westpreussen).....	9,964	1,408,229
Berlin.....	35	1,315,287
Brandenburg.....	16,560	2,342,411
Pomerania (Pommern).....	11,762	1,505,575
Posen.....	11,311	1,715,618
Silesia (Schlesien).....	15,743	4,112,219
Saxony (Sachsen).....	9,863	2,428,367
Schleswig-Holstein.....	7,360	1,150,306
Hanover (Hannover).....	15,031	2,172,702
Westphalia (Westfalen).....	7,892	2,304,580
Hessen-Nassau.....	6,128	1,592,454
Rhine (Rheinland).....	10,543	4,944,527
Hohenzollern.....	447	66,720
Total.....	136,075	28,318,704

POPULATION OF PRINCIPAL TOWNS. JAN. 1, 1886.

Towns.	Pop.	Towns.	Pop.
Berlin (1880).....	1,574,485	Aachen.....	95,725
Breslau.....	299,640	Krefeld.....	90,234
Cologne (Köln) (1880).....	282,537	Halle on Saale.....	81,982
Magdeburg.....	201,918	Dortmund.....	78,135
Frankfurt-on-Main.....	178,660	Posen.....	68,315
Königsberg.....	151,151	Essen.....	65,061
Hanover.....	139,731	Kassel.....	64,083
Altona.....	126,306	Erfurt.....	58,386
Düsseldorf.....	115,190	Görlitz.....	55,702
Danzig.....	114,805	Wiesbaden.....	55,454
Elberfeld.....	109,218	Frankfurt on Oder.....	54,085
Barmen.....	103,068	Kiel.....	51,706
Stettin.....	99,543	Potsdam.....	50,877

CONSTITUTION AND GOVERNMENT.—The constitution of Prussia, has undergone many revisions. The last two were on Feb. 19, 1879, and May 27, 1888. The fundamental laws vest the executive and part of the legislative authority in the king, who attains his majority at the age of eighteen. The crown is hereditary in the male line, and in the order of primogeniture. In the exercise of the government, the king is assisted by a council of ministers appointed by royal decree. The legislative authority the king shares with a representative assembly, the Landtag, composed of two chambers, the first called the "Herrenhaus," or house of lords, and the second the "Abgeordnetenhaus," or chamber of deputies. The assent of the king and both chambers is requisite for all laws. Financial projects and estimates must first be submitted to the second chamber, and either accepted or rejected *en bloc* by the upper house. The right of proposing laws is vested in the government and in each of the chambers.

The upper chamber is now composed of, first, the princes of the royal family who are of age, including the scions of the formerly sovereign families of Hohenzollern-Hechingen and Hohenzollern-Sigmaringen; secondly, the chiefs of the mediatised princely houses, recognized by the Congress of Vienna, to the number of sixteen in Prussia; thirdly, the heads of the territorial nobility formed by the king, and numbering some fifty members; fourthly, a number of life-peers, chosen by the king from among the rich land-owners, great manufacturers, and "national celebrities;" fifthly, eight titled noblemen elected in the eight provinces of

Prussia by the resident land-owners of all degrees; sixthly, the representatives of the universities, the heads of "chapters," and the burgomasters of towns with above fifty thousand inhabitants; seventhly, an unlimited number of members nominated by the king for life or for a more or less restricted period.

The second chamber consists of 432 members—352 for the old kingdom, and the rest added in 1867 to represent the newly-annexed provinces; the proportion to the population is now (1891) 1 to every 69,300.*

The king of Prussia and his chief ministers of state are the same as those of the German empire, for which see that topic in these Revisions and Additions. The salary of the president of the council is 54,000 marks; and the salary of each of the other ministers (11 in number) is 36,000 marks. Members of the second chamber receive traveling expenses and diet from the state according to a scale fixed by law amounting to 20 marks or \$5 per day.

RELIGION.—Absolute religious liberty is guaranteed by the constitution. Nearly two-thirds of the population are Protestants, and nearly one-third are Catholics. The numbers and proportions of the different creeds at the census of 1885 were as follows: Protestants, 18,244,405, or 64.4 per cent.; Roman Catholics, 9,621,763, or 33.9 per cent.; other Christians, 82,030, or .29 per cent.; Jews, 366,575, or 1.29 per cent.; others and unknown, 3,697. Protestants are in a decided majority in the provinces of Schleswig-Holstein, Pomerania, Brandenburg, Saxony, Berlin, Hanover, East Prussia, and Hessen-Nassau (from 98 to 70.3 per cent.); Roman Catholics are in the majority in Hohenzollern (95 per cent.), Rhineland (71), Posen (66), Silesia (52), Westphalia (52), and West Prussia (50). Jews are most numerous in Berlin (4.8 per cent.), Posen (3), Hessen-Nassau (2.7), West Prussia (1.7), and Silesia (1.2).

The Evangelical or Protestant Church is the state church, and since 1817 has consisted of a fusion of the Lutheran and Calvinistic bodies, from which, however, there are still a few dissenters. It is governed by "consistories," or boards appointed by government, one for each province. There are also synods in most circles and provinces, and general synods representing the *old* provinces only. The constitution of the Catholic Church differs in the various provinces. In the Upper Rhenish ecclesiastical province it is fixed by a concordat between the government and the Pope Pius VII. In every part of the monarchy the crown has reserved to itself a control over the election of bishops and priests. There were in 1880 9,146 Protestant ministers and 8,300 Roman Catholic priests, besides 300 monks and 4,600 nuns. The higher Catholic clergy are paid by the state, the Prince-Bishop of Breslau receiving 34,000 marks a year, and the other bishops about 22,700 marks. The income of the parochial clergy mostly arises from endowments. In the budget of 1888-89 the sum of 3,928,883 marks is set down as direct expenditure in Evangelical Churches, and 1,297,306 marks for the Catholic Church.

EDUCATION.—Education continues to be compulsory in Prussia. Every town, or community in town or country, must maintain a school supported by local rates, supplemented by the state, and administered by the local authorities, who are elected by the citizens, and called aldermen or town councilors. All parents are compelled to send their children to one of these elementary schools, in

*For much additional information concerning the functions of the two chambers, see Britannica, Vol. XX, p. 18.

which all fees are now abolished. No compulsion exists in reference to a higher educational institution than elementary schools. In the budget of 1890-91, the sum of 64,459,503 marks was appropriated for instruction. Of this amount 60,622,143 marks was for ordinary instruction.

IMMIGRATION.—In 1889 the immigration from Prussia by German ports and Antwerp reached a total of 57,957.

FINANCE.—The budget estimates for the year ending March 31, 1891, placed the revenues at 1,591,673,942 marks, and the total expenditures at the same amount.

The national debt of the kingdom inclusive of the annexed provinces, was, according to the budget of 1890-91, as follows:

	Marks.
National debt bearing interest:	
State Treasury Bills.....	60,541,500
Consolidated debt at 4 per cent.....	3,592,667,850
Consolidated debt at 3½ per cent.....	1,476,061,000
Non-consolidated loans.....	17,103,150
Preference loan of 1855.....	9,750,000
War debt of the Kurmark and Neumark.....	803,210
State railway debt.....	11,796,900
Debt of provinces annexed in 1866.....	35,000,651

Total national debt..... 5,204,724,261

The charges for interest, amortisation and management of the debt amounted to 254,563,565 marks in the financial year 1890-91.

The debt amounts to over 9l. 3s. per head of population, and the annual charge to almost .9s. per head. The clear income from the state railways alone in 1888-89 would more than pay for the yearly interest, amortisation, and management of the debt.

PRODUCTIONS IN 1889.—Among the summaries of the reports were the following: Establishments for manufacturing beet-sugar, 317, which consumed 6,282,440 metric tons of beetroot, in the production of 720,806 tons of raw sugar, 162,077 tons of molasses, 22,074 tons of other products. There were 6,817 breweries in operation, brewing a sufficient quantity of beer to supply 15 gallons to every inhabitant of the kingdom.

The coal mines reported an output of 61,436,991 tons. Prussia yields about half of the world's annual production of zinc, copper and lead. The total value of the mining products in 1889 was 466,871,288 marks.

For many other items see **GERMAN EMPIRE** in these Revisions an Additions.

PRYOR, ROGER ATKINSON, an American lawyer, born in Virginia in 1828. He edited various papers in the South; was brigadier-general in the Confederate army; and since the war has practiced law in New York City.

PSALMS. See *Britannica*, Vol. XX, pp. 29-34.

PUBLICANI, the name given by the Romans to those persons who farmed the public revenues. Only Roman citizens were eligible as publicani, and, as a matter of course, only the wealthiest among these could become such. As a wise regulation, no governor of a Roman province was allowed, during the period of his governorship, to have anything to do with these tax-gathering companies. The design of this was to place the governor in such a position that he could afford to act justly towards the people, who were often cruelly oppressed by the exactions of the provincial underlings—the “publicans” of the New Testament.

PUBLIC LANDS. See **SURVEYS OF PUBLIC LANDS OF THE UNITED STATES**, in these Revisions and Additions.

PUEBLO, a city, the county-seat of Pueblo county, Colo., on the Arkansas River, forty miles

east of Cañon City. It is a very important manufacturing and commercial center. The chief industries are car shops, rolling-mills, iron and steel foundries, smelters and nail-mills. Trade and education are in a flourishing condition. Population in 1890, 28,128.

PUERTO BELLO, a small decayed seaport town of the United States of Colombia, on the northern shore of the Isthmus of Panama, and 40 miles north of the town of that name. It is surrounded by mountains, has an excellent harbor, is very unhealthy, and has fallen into decay since the year 1739, when it was stormed by Admiral Vernon, during the war between England and Spain.

PUGGING, a coarse kind of plaster laid on deafening-boards between the joists of floors, to prevent sound.

PUGH, JAMES, L., United States Senator, born in Burke county, Georgia, Dec. 12, 1820. He received an academic education in Alabama and Georgia; came to Alabama when four years old, where he has since resided; was licensed to practice law in 1841, and was so employed when elected to the Senate; was Taylor elector in 1848, Buchanan elector in 1856, and State elector for Tilden in 1876; was elected to Congress without opposition in 1859; retired from Congress when Alabama ordained to secede from the Union; joined the Eu-faula Rifles, in the first Alabama regiment, as a private; was elected to the Confederate Congress in 1861 and reelected in 1863; after the war resumed the practice of the law; was member of the convention that framed the State constitution of 1875; was elected to the Senate in 1880, and was reelected in 1884, and again in 1890. His term of office will expire in 1897.

PULASKI, a village, one of the county-seats of Oswego county, N. Y., on Salmon River, near Lake Ontario, forty miles north of Syracuse. It is the headquarters of a variety of milling and manufacturing industries.

PULASKI, a village, the county-seat of Giles county, Tenn., on Richland Creek, thirty-two miles south of Columbia. It contains fine public buildings and many mills, is an important shipping-point for cotton and the seat of two seminaries.

PULASKI, CASIMIR (1748-1779), a Polish count and patriot, born in Podolia in 1748. He joined his fathers and brothers in the struggle against King Stanislaus Augustus, and after their death took command of the insurgents; was outlawed and sought refuge in various countries; became acquainted with Benjamin Franklin in Paris; came to America, and distinguished himself in the defense of the colonists; was mortally wounded at the siege of Savannah, and died Oct. 11, 1779, in that city, where a monument, the cornerstone of which had been laid by Lafayette, was completed in 1855.

PULITZER, JOSEPH, an American journalist, born in Hungary in 1847. He was educated at Buda-Pesth; came to America and settled in St. Louis; became a member of the Missouri legislature in 1869; attained distinction as a journalist; founded the St. Louis “Post-Dispatch;” became proprietor of the New York “World” in 1888; and a member of Congress in 1884.

PULLMAN, GEORGE MORTIMER, an American inventor, born in Chautauqua county, N. Y., in 1831. He went to Chicago in 1859; invented the sleeping-car, the palace-car, and the vestibule train; and founded the industrial city of Pullman (population 12,000), which became a part of Chicago in 1890.

PULNEYS, a range of hills in the Madras district of the Madras Presidency of India. The aver-

age height of this range is about 7,500 feet above the level of the sea. The climata is one of the most equable anywhere to be found.

PULSZKY, FERENCZ AUREL, a Hungarian patriot and author, born at Saros in 1814. He traveled extensively, and published in 1837 his *Diary of the Travels of a Hungarian in Great Britain*; became a member of the diet in 1840; was active in the movement of 1848; was Kossuth's ambassador to England, and accompanied that patriot to America; was sentenced to die; but returned in 1866, on the publication of the general amnesty; and has since held important offices.

PUMPELLE, RAPHAEL, an American geologist, born at Oswego, N. Y., in 1837. He was educated in France and Germany; was employed by the Chinese government to investigate the coal supply of China, and afterwards traveled overland through Mongolia, Siberia and Russia; has done much important geological work for the United States Government, and is author of many scientific memoirs.

PUN, the name given to a play upon words. The wit lies in the equivocal sense of some particular expression, by means of which an incongruous, and therefore ludicrous idea is unexpectedly shot into the sentence.

PUNKAH, a gigantic fan for ventilating apartments, used in India and tropical climates. It consists of a light frame of wood, covered with calico, from which a short curtain depends, and is suspended by ropes from the ceiling; another rope from it passes over a pulley in the wall to a servant stationed without; the servant pulls the punkah backwards and forwards, maintaining a constant current of air in the chamber.

PUNT, a heavy, oblong, flat-bottomed boat, useful where stability and not speed is needed. Punts are much used for fishing. Some are fitted for oars, but the more usual mode of propulsion is by poles operating on the bottom. Punting is a very laborious exercise.

PURCELL, JOHN BAPTIST, a Roman Catholic archbishop, born in Ireland in 1800, died in 1883. He became president of Mount St. Mary's College, in Maryland, in 1829; bishop of Cincinnati 1838; archbishop 1850; was a noted controversialist, and a writer of school-books. An attempt to found a great theological seminary led to a serious financial embarrassment, which clouded the closing years of his life.

PURPLE WOOD, or **PURPLE HEART**, the heartwood of *Copaifera pubiflora* and *C. bracteata*, a very handsome wood of a rich plum color. The trees producing it are natives of British Guiana, where the wood is called generally *Mariwayana*. The chief value of the wood lies in its remarkable adaptation to the purposes of artillery and fire-arms.

PUTCHUK, an aromatic root, a considerable article of commerce in India, where it is used both as a perfume and as a medicine, and of export to China, where it is much used for incense, as it gives out a very pleasant odor when burned. It appears to be the *Costus* of the ancients.

PUT-IN-BAY, a village and summer resort of Ohio, situated on Lake Erie, forty miles east of Toledo. It is noted as being near the scene of Perry's victory, Sept. 10, 1813.

PUTNAM, a village of Connecticut, on the Quinebaug River, twenty-five miles south of Worcester. It has important manufactories of cotton and woolen goods.

PUTNAM, FREDERICK WARD, an American anthropologist, born in Massachusetts in 1839. He has been prominently connected with many scientific enterprises, and is said to be better acquainted with the subject of American archaeology than any

other man; became permanent secretary of the American Association for the Advancement of Science in 1873, and president of the Boston Society of Natural History in 1887.

PUTNAM, ISRAEL, a noted American Revolutionary general. See Britannica, Vol. XXIII, p. 790. His cousin, **RUFUS PUTNAM** (1738-1824), was also a noted general, and was one of the most prominent pioneer settlers of Ohio.

PUY, the name commonly given in the highlands of Auvergne and the Cevennes to the truncated conical peaks of extinct volcanoes. It is perhaps connected with *puit* or *puits*, "a well" or "vent," and may have been given in allusion to the craters of these mountains.

PUZZOLANA, a mineral substance, produced by volcanoes, and abundant in volcanic countries. It derives its name from Puzzuoli near Naples. It is earthy in character, consisting of particles in a very loose state of aggregation, but its chemical composition agrees with that of Basalt. It is found of various colors.

PYNCHON, WILLIAM, a theologian and colonist, born in Springfield, England, in 1590, died at Wraybury, England in 1662. He was one of the founders of Springfield, Mass. His only son, **JOHN PYNCHON**, born in Springfield, Eng., in 1627, died in Springfield, Mass., in 1703, was a distinguished colonial statesman. A great-grandson of the latter, **CHARLES PYNCHON**, born in Springfield, Mass., in 1719, died there in 1783, was an eminent physician. Another great-grandson, **WILLIAM PYNCHON** (1723-1789), was one of the most distinguished lawyers in the colony, a teacher of jurisprudence, a standard loyalist, and author of a remarkably interesting diary covering the Revolutionary period. **JOSEPH PYNCHON** (1737-1794), William's brother, was a merchant and a scientist. Joseph's only son, **THOMAS RUGGLES PYNCHON** (1760-1796), attained great distinction as a physician and surgeon. **THOMAS RUGGLES PYNCHON**, the younger, grandson of the preceding, born at New Haven in 1823, was educated at Boston and Hartford; ordained deacon in 1848 and priest in 1849; has been long connected with Trinity College, Hartford; became its president in 1874; and is a prominent member of many learned societies.

PYNE, LOUISA, a popular English singer, daughter of a well-known singer, James Pyne, born in 1832. She received instruction from Sir George Smart, and first appeared in public in London in 1842. She appeared in Paris in 1847, made her debut in opera in 1849, and has since visited America. She is chiefly known from her being chief soprano of an English opera company, in which she was associated with Mr. Harrison at the Lyceum, Drury Lane and Convent Garden.

PYRITZ, a very ancient town of Prussian Pomerania, in the government of Stettin, twenty-five miles southeast of the town of Stettin. There are standing five high towers on the town-walls, built by the Wends, under whom it was a place of great strength. There is a seminary named after Otto, Bishop of Bamberg, near the spring where it is said, he, in 1124, baptised the first Pomeranian converts. Pyritz has manufactories of woolen cloth and leather. Population in 1871, 7,065.

PYRRHIC DANCE, the most famous of all the war-dances of antiquity, said to have received its name from Pyrrichos, or, according to others, from Pyrrhus or Neoptolemus, the son of Achilles. According to Plato it aimed to represent the nimble motions of the warrior either avoiding missiles and blows, or assaulting the enemy; and in the Doric states it was as much a piece of military training as an amusement.



QUACKENBUSH - QUAY

QUACKENBUSH, JOHN A., a member of Congress, was born in Schaghticoke, N. Y., in 1828. Was supervisor of his town from 1860 to 1862; was chairman of the board of supervisors of the county of Rensselaer in 1862; member of the Assembly 1862; sheriff of Rensselaer county from 1873 to 1876; was elected to Congress 1891, and reelected for the term ending in 1893.

QUADRANGLE, an open square, or court-yard having four sides. Large public buildings are usually planned in this form.

QUADRILLE, a dance of French origin, consisting of consecutive dance movements, generally five in number, danced by couples, or sets of couples, opposite to, and at right angles to each other. The name seems to be derived from its having been originally danced by four couples.

QUAIL, see **PARTRIDGE** in these Revisions and Additions.

QUAIN, RICHARD, an Irish physician, born at Mallow, Ireland, in 1816, died in London in 1887. He studied medicine in the London University, and graduated as M. D. in 1843. He was house physician to the University College Hospital in London. In 1846 he became a member of the Royal College of Physicians, and in 1871, he was elected a fellow of the Royal Society. His principal work is a *Dictionary of Medicine* (1882). He also contributed valuable articles to medical journals and to the transactions of learned societies.

QUAKER CITY, a popular name for Philadelphia, which was settled by English Friends or Quakers under William Penn.

QUAKER POET (1784-1849), the popular designation of Bernard Barton, an English poet, and of the eminent American poet, John Greenleaf Whittier, born in 1807; both members of the Society of Friends.

QUAKERS. See **RELIGIOUS DENOMINATIONS**, in these Revisions and Additions.

QUAKERTOWN, a manufacturing borough of Pennsylvania, eighteen miles south of Bethlehem. It contains many manufactories of stoves, musical instruments, agricultural implements, boots and shoes, cigars, carriages and wagons.

QUAKING GRASS, a genus of grasses, having a loose pinnacle, drooping spikelets, generally remarkable for their broad and compressed form, suspended by delicate footstalks, and tremulous in every breath of wind. The species are few, and mostly European. They are all very beautiful.

QUANG-NAM, KUANG-NAM, or TUON, a town of Anam, about seventy-five miles southeast from Hué or Phu-thuan-thien, the capital of Anam. It is situated near the head of a beautiful gulf, and is a place of considerable trade.

QUARANTINE. See *Britannica*, Vol. XX, pp. 153-158.

The United States first adopted a quarantine law in February, 1799. This law required federal officers to assist in executing State or municipal quarantine regulations. On April 29, 1878, Congress enacted a national quarantine law, which authorized the establishment in certain contingencies of national quarantines. This law does not restrict or extend the time of detention to forty days. The detention lasts until the vessel or person

detained is in a thoroughly sanitary condition. The detention may therefore be for only a few days or it may last longer than forty days.

QUARTER-DECK of a ship, an upper deck extending from the main-mast to the poop, or, when there is no poop, from the main-mast to the stern.

QUARTERS, in naval and military affairs, generally, the positions assigned to persons or bodies of men. In a more special sense, the quarters in the army are the places of lodging assigned to officers or men when not actually on duty. Headquarters is the place of residence of the commanding officer of a force, or of a section of a force. In the navy, quarters has the special meaning of the positions to be taken by every man in actual combat.

QUARTER-STAFF, a stout pole of heavy wood, about six feet long, shod with iron at both ends, formerly a favorite weapon with the English for hand-to-hand encounters. It was grasped in the middle by one hand, and the attack was made by giving it a rapid circular motion, which brought the loaded ends on the adversary at unexpected points.

QUARTETTE, a piece of music arranged for four voices or instruments, in which all the parts are *obligati*, that is, no one can be omitted without injuring the proper effect of the composition.

QUATREFAGES, DE BRÉAU, JEAN LOUIS ARNAND DE, a French naturalist, born at Berthezème, Department of Gard, in 1810. After studying medicine and the natural sciences, he was made professor of zoölogy at Toulouse in 1833. But he soon went to Paris. In 1850 he was appointed professor of natural history in the Lycée Napoleon, and in 1856 professor of anatomy and ethnology in the Museum of Natural History. He wrote a number of works on his favorite sciences. We mention his *Physiologie comparée; Métamorphose de l'Homme et des Animaux; Histoire de l'Homme; Charles Darwin et ses Précurseurs français; La Race prussienne; Crania ethica; L'Espèce humaine* (1877); *His Natural History of Man*, and several other of his works have been translated into English.

QUASIMODO SUNDAY, called also **DOMINICA IN ALBIS**, the first Sunday after Easter. The name Quasimodo Sunday is taken from the first words of the Introit (1 Peter, ii. 2) of the mass of the day. The name *Dominica in Albis* is derived from the custom which was formerly observed of the neophytes who had been baptised at Easter appearing in white garments in the church.

QUASS, a sort of weak beer produced in Russia by fermenting rye-meal in warm water. It is usually bottled in stone bottles, and is a favorite beverage with the people generally. When it becomes too sour, it is used as vinegar.

QUAY, MATTHEW STANLEY, an American statesman, born in Dillsbury, Pa., in 1833. He was admitted to the bar in 1854; elected prothonotary of Beaver county in 1856 and re-elected in 1859; was a lieutenant in the 10th Pennsylvania reserves; colonel of the 134th Pennsylvania volunteers; lieutenant-colonel and assistant commissary-general; military State agent at Washington; private secretary to the governor of Pennsylvania; major and chief of transportation and telegraphs; mili-

tary secretary to the governor of Pennsylvania, 1861-'65; member of the legislature, 1865-'67; secretary of the Commonwealth, 1872-'78; recorder of the city of Philadelphia, and chairman of Republican State committee, 1878-'79; secretary of the Commonwealth, 1879-'82; delegate at large to the Republican national conventions of 1872, '76, and '80; was elected State treasurer in 1885; elected to the United States Senate, 1887; was a delegate at large to the Republican national convention of 1888; was elected a member of the Republican national committee, and made chairman thereof, in 1888; conducted the campaign of 1888, which resulted in the election of Harrison and Morton. His term of service in the senate will expire in 1893.

QUEBEC, a city of Canada. See *Britannica*, Vol. XX, p. 168.

QUEEN ANNE'S BOUNTY, founded by that sovereign in 1703, consisted of the first fruits and tenths, which are apportioned by commissioners among poor benefices in England and Wales. In 1890 the incomes of eighty-seven benefices, varying from *nil* to about \$1,000 per annum, were augmented. The total amount of the grants voted is \$110,000.

QUEEN CITY, a popular name for Cincinnati, first used to designate it as the western metropolis.

QUEENSLAND. For general article on QUEENSLAND, a province of Australia, see *Britannica*, Vol. XX, pp. 171-75. The latest reports place the area of Queensland at 668,497 square miles, with a seacoast of 2,250 miles. The population on May 1, 1890, was returned at 406,658*.

PRESENT CONSTITUTION AND GOVERNMENT.—The power of making laws and imposing taxes is vested in a parliament of two Houses—the Legislative Council and the Legislative Assembly. The former consists of thirty-nine members, nominated by the crown for life. The legislative assembly comprises seventy-two members, returned from sixty electoral districts, for five years, elected by ballot, a six months' residence qualifying every adult male for the franchise. Owners of freehold estate of the clear value of 100*l.*, or of house property of 10*l.* annual value, or leasehold of 10*l.* annual rent, or holders of the pastoral lease or licence from the crown, have the right of a vote in any district in which such property may be situated. At the end of 1889 there were 73,957 registered electors.

The executive government is vested in a governor appointed by the British crown; salary, \$25,000 per annum. He is assisted by a cabinet or executive council of eight ministers, each of whom receives a salary of \$5,000 per year. They are jointly and individually responsible for their acts. The vice-president of the council receives a salary of \$1,500.

The present governor (1891) is General Sir Henry Wylie Norman. In 1862, military secretary to the government of India; 1870, member of the viceroy's council; 1878, member of council of India in London; 1883-88, governor of Jamaica; appointed governor of Queensland, Dec., 1886.

Queensland is now divided into twenty-eight "Municipalities" seven "Shires," and 106 "Divisions." These have local government much after the manner of the local government of smaller districts in Great Britain.

MOVEMENT OF POPULATION.—The largest of the municipalities is the city of Brisbane, the capital of the colony, and the seat of government. It had a municipal population of 32,567 on May 1, 1886, but on the same date 73,649 persons were located

within a five-mile radius. The three next largest towns of the colony are Rockhampton, with an estimated population of 13,212; Maryborough, with 12,000; Townsville, with 11,454; and Ipswich, with 9,575 inhabitants in 1888.

In 1889 the immigration of Queensland aggregated 35,606, and the immigration from that province reached 24,680.

FINANCE REVENUE AND EXPENDITURES.—The revenue in 1890 aggregated £3,211,795, and the expenditures £3,695,775.

The following were the chief sources from which revenue was received: Customs, 1,209,586*l.*; excise, 37,198*l.*; stamp duty, 133,984*l.*; licenses, 56,899*l.* From land—Rent, pastoral occupations, 318,440*l.*; other rents and sale of land, 276,700*l.* From railways, 776,060*l.* From posts and telegraphs, 216,219*l.*

The chief items of expenditure during 1889-90 were as under:—Interest on public debt, 1,099,402*l.*; endowments to municipalities, 92,120*l.*; endowments to divisional boards, 186,921*l.*; public instruction, 240,660*l.*; colonial treasurer's department, 169,010*l.*; secretary of public lands department, 132,011*l.*; cost of working railways, 618,778*l.*; posts and telegraphs department, 316,771*l.* The total expenditure from loans resulting on public works was 1,549,388*l.*, of which the following are the principal items:—On immigration, 93,756*l.*; on electric telegraphs, 23,964*l.*; on railways, 1,073,323*l.*; on harbours and rivers, 137,592*l.*

The estimated revenue for 1890-91 is 3,708,000*l.*, and the estimated expenditure 3,602,002*l.* The estimated value of the landed property of the colony in 1889, as taken for purposes of assessment under the several acts for providing local government, was 51,793,777*l.* This does not include lands leased for pastoral purposes, the lessees' interest in which has been capitalized for assessment purposes at 4,180,419*l.*, nor unoccupied crown lands, nor lands the property of local bodies, churches, or reserves for public purposes.

The public debt of the colony amounted, on June 30, 1890, to the sum of 28,105,684*l.*

EDUCATION AND RELIGION.—Education is, by statute, compulsory. In 1880 there were eight grammar schools, with 45 teachers, and 742 pupils; 584 public schools, with 1,497 teachers, and an average daily attendance of 40,412 pupils. Besides these there were 130 private schools, with 457 teachers, and an average attendance of 7,809 pupils.

For Religion of Queensland see RELIGIONS OF THE WORLD, in these Revisions and Additions.

ARMY AND NAVY.—The defense of the colony was provided for by an act passed in 1884, by which, in addition to fully paid militia and volunteer corps to be maintained and assisted by the government, every man, (with a very few exceptions) between the ages of 18 and 60, is liable for military service under this act. The government in 1890, organized a drilled force of 4,500 men, about 140 of whom were fully paid regulars; some 2,500 militia, paid for each day's drill; the rest volunteers, assisted with uniform, etc. Naval defenses are provided for with two gunboats, a torpedo boat and a picket boat and six corps of naval reserve and naval artillery. In addition, some of the tugs built for the harbor service were fitted with a bow gun for service if required.

AGRICULTURAL LANDS.—Of the total area of the colony 9,919,692 acres, or but little more than two per cent., have been alienated by the government up to Dec. 31, 1889, yielding a return of 6,272,991*l.* Under a land act passed in 1884, a maximum of 1,280 acres of agricultural land can be selected on a lease for 50 years, and a maximum of 20,000 acres of pastoral land for 30 years. The agricultural land

* Statesman's Year-Book, 1891.

can afterwards be secured in fee simple under certain conditions and in return for certain payments. In both cases there are numerous conditions and restrictions contained in the act, and in the rules framed in accordance with its provisions.

NAVIGATION, SHIPPING AND COMMERCE.—In 1889, 760 vessels of 506,780 tons, entered, and 778 of 494,229 tons cleared, the ports of the colony; of the former, 89 of 109,006 tons were from the United Kingdom, and 529 of 326,775 tons from the Australasian colonies; and of the latter 24 of 53,453 tons were from the United Kingdom, and 596 of 365,358 tons were from the Australasian colonies. Vessels entering and clearing more than one port on the same voyage are only counted at one port of arrival and departure. There was registered in the colony 32 ocean steamers of 20,392 tons, 33 harbor steamers of 2,924 tons, and 58 river steamers of 1,955 tons.

A very large number of articles are subject to tariffs. The total customs collected in 1889 amounted to £1,344,472. This was about 20 per cent. of the imports.

INTERNAL COMMUNICATIONS.—At the end of 1889 there were 2,604 miles of railway open for traffic in the colony, and 571 miles more in course of construction or authorized. The railways are all in the hands of the government, and the cost of construction on opened lines up to the end of 1889 has been 13,332,046*l.* The revenue from railways during 1889 was 796,344*l.*, and the expenditure in working them 594,649*l.* The total expenditure to Dec. 31, 1889, has been 15,374,420*l.*

QUENTIN, St., a thriving manufacturing town in the north of France, department of Aisne, situated on the Somme, about eighty miles northeast of Paris. It is a station on the railway from Paris to Liège, has a celebrated church, and is the center of the manufacture of linen, muslin, lace, and gauze. Population, 28,880. The Canal of St. Quentin, connecting the basin of the Somme with that of the Scheldt, was finished by Napoleon in 1810. It is carried through the intervening hills by tunnels.

QUESATENANGO, a town of Guatemala, Central America, the capital of a department of the same name. It is sixty-six miles west of Guatemala, and stands in an elevated table-land, on a river which flows into the Pacific Ocean. After Guatemala itself, it is the most important town in the state. It manufactures cotton and woolen fabrics, and carries on a considerable trade. Population, 25,000, mostly Indians.

QUINCE (*Cydonia*), a genus of trees and shrubs of the natural order *Rosaceæ*, sub-order *Pomeæ*, nearly allied to *Pyrus*, with which many botanists have united it, but distinguished by having many instead of two seeds in each cell, and by their very mucilaginous nature. The Common Quince (*C. vulgaris*), a native of the south of Europe and temperate parts of Asia, is a low tree, with generally tortuous branches; ovate, entire, deciduous leaves, which are downy on the under side; and rather large, whitish flowers, which are solitary at the extremity of young branches. The fruit is in some varieties globose; in others, pear-shaped, of a rich yellow or orange color, with a strong smell. It is hard and austere, but when stewed with sugar, becomes extremely pleasant, and is much used in this way either by itself, or to impart a flavor to apple-pies. It is also much used for making a preserve called *Quince Marmalade*. A delicious beverage, somewhat resembling cider, is made from it. The seeds readily give out their mucilage to water, so that they turn 40 or 50 times their weight of water into a substance as thick as

syrup. Quince mucilage, or quince gum, *Cydonin*, is allied to Bassorin, but differs from it in being readily soluble in water, while it differs also in some particulars from Arabin. The quince was cultivated by the ancient Greeks and Romans, and is at the present day cultivated in the south of Europe, in England, and generally in temperate climates. In Scotland, the fruit seldom ripens except on a wall. The JAPANESE QUINCE (*C. Japonica*, better known by its older name *Pyrus Japonica*), a low bush, a native of Japan, but perfectly hardy in Great Britain, is often to be seen trained against walls, being very ornamental from the profusion of its beautiful flowers. See *Britannica*, Vol. XX, p. 182.

QUINCY, a city of Illinois. Population in 1890, 31,478. See *Britannica*, Vol. XX, p. 182.

QUINCY, a city of Massachusetts. Population in 1890, 16,723. See *Britannica*, Vol. XX, p. 182.

QUINCY, a village of Michigan. It has several mills and factories for the manufacture of lumber, flour, sash, door and barrels.

QUINCY, the name of a noted Massachusetts family.

JOSIAH QUINCY, Jr. (1744–1775), was renowned for his eloquent advocacy of the rights of the colonists. See *Britannica*, Vol. XX, pp. 182–3.

His son, JOSIAH QUINCY (1772–1864), was a leader of the Federal party, and an able president of Harvard University. See *Britannica*, *ibid.*

EDMUND QUINCY (1681–1738), was a member of the general court and of the governor's council for many years. In 1737 he went to England to plead the case of Massachusetts in a boundary dispute with New Hampshire. He died at London in 1738, and the colony ordered a monument to be erected there to his memory.

Another EDMUND QUINCY, son of President Josiah Quincy, was born at Boston in 1808 and died in 1877. He was secretary of the American Anti-Slavery Society, and published a novel, *Wensley* (1854), and a biography of his father (1867). He also edited his father's *Speeches* (1875).

His brother, JOSIAH QUINCY (1802–1882), was president of the Massachusetts senate in 1842 and mayor of Boston in 1845. He promoted several improvements in municipal affairs, especially the introduction of the water-supply from the Cochituate River. Near the end of his career he contributed to the "Independent" sketches which have been collected under the name, *Figures of the Past* (1882).

His son, SAMUEL MILLER QUINCY, born in 1833, was a lawyer, and edited the "Monthly Law Reporter." He served in the Union army during the civil war, and rose to the rank of colonel with the brevet of brigadier-general.

His brother, JOSIAH PHILLIPS QUINCY, born in 1829, has published some dramas, *Lyteria* (1855), *Charicles* (1856), and a political essay on the *Protection of Majorities* (1876).

QUININE. See *Britannica*, Vol. XX, pp. 184–86.

QUINN, JOHN, member of Congress, born in Ireland in 1839. He immigrated to the United States at the close of the war; settled in New York City, where he entered enthusiastically into the agitation of that period for the education and improvement of the laboring classes; was conspicuous as one of the champions of the eight-hour law 1868–70; was elected to the Legislature in 1882, and was a member of the board of aldermen 1885–87; was a delegate to the Democratic national convention at Chicago in 1884 and to St. Louis in 1888; member of Congress 1889–91.

QUINTARD, CHARLES TODD, an American divine, bishop of the Protestant Episcopal Church, born in Connecticut in 1824. He was a noted physician and professor of physiology; was ordained in 1855; was chaplain in the Confederate army; consecrated bishop of Tennessee in 1865; is a distinguished promoter of education.

QUINETTE, a musical composition for five voices, or for five instruments, each of which is *obligato*. The most remarkable quintettes for stringed instruments are those of Boccherini, Mozart, Beethoven, and Onslow, and for wind instruments, those of Reicha.

QUINTUS CURTIUS RUFUS, a Roman historian who flourished probably in the time of Vespasian. His work entitled *De Rebus Gestis Alexandri Magni Regis Mecedonum*, consisted of ten books; but of these the first two are lost, and the other eight are occasionally imperfect. Its style is flowing and ornate, but it wants the pure Latin of Cicero, and the simplicity of Cæsar. Along with the Greek history of Arrian it forms our most valuable source of information respecting the military career of Alexander the Great, although it is not entirely free from geographical, chronological, and strategic blunders.

QUIRK, a small angle or recess between moldings. It is much used in Greek and Gothic architecture, and sometimes in Roman.

QUITMAN, a village of Georgia, on the Ocopec River, twenty-five miles east of Thomasville. It is the seat of an academy, and has a good trade.

QUITMAN, JOHN ANTHONY, an American general and politician, was born at Rhinebeck, N. Y., in 1779, died in 1858. He attained distinction as a politician in Mississippi; was major-general during the Mexican war; became governor of Mississippi in 1850; and member of Congress in 1855.

QUORUM. The word in Latin is the genitive of *qui*, "who," and literally means "of whom." As applied to deliberative or any organized bodies means the number of members of a body whose presence in a meeting is necessary to make its proceedings legal. If no specific rule as to the number required has been required by the body, a majority of the members is a quorum. If the body is large it is customary in the adoption of rules to specify a less number as a quorum. In the British house of commons forty members constitute a quorum; in the House of Representatives of the United States of America a majority of all the members makes a quorum. In the New York State senate the rule requires the presence of three-fifths of the members.

The great importance which the general question of a quorum has recently assumed in the United States makes the insertion of the authorized method, pursued by the United States House of Representatives, a matter of interest. The following is the full text of the chapter on "Quorum," as found in the latest edition of the *Rules and Practice of the House of Representatives* in the second Session of the Fifty-first Congress, closing March 4, 1891.*

"The House of Representatives shall be composed of members chosen every second year by the people of the several States." Const., 1, 2, 4—and "a majority of each house shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to

compel the attendance of absent members, in such manner and under such penalties as each house may provide."—Const. 1, 5, 8.

In view of the foregoing clauses of the constitution, it was decided, during the Thirty-seventh Congress, to which several of the States had failed to send Representatives, that a majority of the members chosen constituted a quorum to do business.—*Journal*, 1, 87, p. 117.

In view of the important ruling of Speaker Reed on the 29th of January, 1890, on the point of order raised by Mr. Crisp that "no quorum" had voted on the question of "consideration" raised by him against the report of the Committee on Elections in the contested election case of *Smith vs. Jackson*, from the Fourth Congressional district of the State of West Virginia, that ruling is herewith given in full as a matter of interest and convenient reference. At the conclusion of the roll-call on the said question of consideration raised by Mr. Crisp, the Speaker announced the result to be, yeas 162, nays three. Thereupon Mr. Rogers, who had voted in the affirmative, and Mr. Covert and Mr. Cowles, who had voted in the negative, withdrew their votes, leaving the vote, yeas 161, nays 1. The said vote having been announced by the Speaker, Mr. Crisp raised the question of "no quorum." Thereupon the Speaker directed the Clerk to enter upon the Journal the names of certain members as "present and refusing to vote," and announced and ruled that a quorum was present within the meaning of the constitution upon the following grounds, viz:

The clerk announces the members voting in the affirmative to be 161 and 2 in the negative. The Chair thereupon, having seen other members present, having heard their names called in their presence, directed the call to be repeated, and, since gentlemen did not answer when thus called, the clerk directed a reading of their names to be made showing the fact of their presence as being upon the question which has been raised, namely, whether there is a quorum of this House present to do business, according to the Constitution of the United States; and accordingly that question is now before the House, and the chair purposes to give a statement accompanied by a ruling, from which an appeal can be taken if any gentleman is dissatisfied therewith.

There has been for some considerable time a question of this nature raised in very many parliamentary assemblies. There has been a great deal of doubt, especially in this body, on the subject, and the present occupant of the Chair well recollects a proposition or suggestion made ten years ago by a member from Virginia, Mr. John Randolph Tucker, an able constitutional lawyer as well as an able member of this House. That matter was somewhat discussed and a proposition was made with regard to putting it into the rules. The general opinion which seemed to prevail at that time was that it was inexpedient so to do; and some members had grave doubts whether it was proper to make such an amendment to the rules as would count, as a part of the quorum, the members present and not voting as well as those present and voting. The evils which have resulted from the other course were not then as apparent as now, and no such careful study had been given to the subject as has been given to it since.

That discussion took place in the year 1880. Since then there has been various arguments and various decisions by eminent gentlemen upon the subject, and these decisions have very much cleared up the question, and it is much more apparent what the rule is. One of the first places in which the question was raised was in the senate of the State of New York. The present governor of New York was then the presiding officer and upon him was devolved a duty similar to that which has been devolved upon me to-day. He met the duty in precisely the same manner. The question there raised was as to the necessity, under their constitution, of the actual participation by voting of the three-fifths constituting a quorum for the passage of certain bills, and he held that that constitutional provision as to a quorum was entirely satisfied by the presence of the members even if they did not vote, and accordingly he directed the recording officer of the senate to put down certain names as a part of the record of the transaction, that is, to put down the names of the members of the senate who were present and refused to vote in precisely the manner in which the occupant of this chair has directed the same thing to be done. That decision must be regarded as in, no sense partisan, at least as the chair cites it.

There has also been a decision in the State of Tennessee, where the provisions of the law require a quorum to consist

*Each session makes its own rules of order, but always in harmony with the constitution. See *Digest, and Manual of the Rules and Practice of the House of Representatives* etc. Compiled by Henry H. Smith, Journal Clerk of the House of Representatives, under Resolutions of the House of October 1, 1890. Vol. VIII, pp. 699.

of two thirds. In the legislature of 1885 the house had ninety-nine members, of which two thirds was sixty-six. A registration bill was pending which was objected to by the Republicans, a number of the house. Upon the third reading the Republicans refused to vote, whereupon the speaker, a member of the other party, directed the clerk to count as present those there but not voting, and, a quorum being present, declared the bill passed upon this reading.

These two decisions made, in 1883, and the other in the year 1885, seemed to present occupant of the chair, to decide every question; but there is an entirely familiar process which every old member will recognize, which, in the opinion of all the members present, is incontrovertible evidence of the recognition at all times of the right to regard members present as constituting a part of a quorum. It has been almost an every-day occurrence at certain stages of the session for votes to be announced by the chair containing obviously and mathematically incorrect figures, and yet the bill has been passed. That can only be upon a very distinct basis, and that is that every body present is entirely agreed to the fact that there was a quorum present, while the figures demonstrated no quorum voting. There is no ground by which under any possibility such a bill could be passed constitutionally, unless the presence of a quorum is inferred. It is inferred from the fact that no one raised the question, and the presence was deemed enough.

All methods of determining a vote are of equal value. The count by the speaker or chairman, and the count by tellers, or a count by the yeas and nays, are all of them of equal validity. The House has a right, upon the call of one-fifth of the members, to have a yeas-and-nays vote, and then upon that the question is decided; but the decision in each of the other cases is of precisely the same force and effect.

Again, it has always been the practice in the parliamentary bodies of this character, and especially in the parliament of Great Britain, for the speaker to determine the question whether there is or is not a quorum present by count. It is a question simply of the actual presence of a quorum, and the determination of that is intrusted to the presiding officer in almost all instances. So that when a question is raised whether there is a quorum or not, the question is a judicial arrangement for determining the fact, and would be determined on a count by the presiding officer. Again, there is a provision in the constitution which declares that the House may establish rules for compelling the attendance of members. If members can be present and refuse to exercise the privilege, they cannot be counted as a quorum. If the provision would seem to be essential to the constitution, inasmuch as the constitution provides for their attendance, only that attendance is enough. If more was needed the constitution would have provided for more.

The chair feels very much disposed to cause to be read the action of the present governor of the State of New York, then lieutenant-governor and presiding officer of the senate. The action of the senate was this: The president put the question whether the senate would agree to the final passage of said bill, and eighteen senators voted in favor thereof, and Messrs. Allen, Bowen, Evans, Holmes, F. Lansing, Lord, Lynde, Pitts, Russell, and Thomas, being present and refused to vote.

Then comes the votes. For the affirmative, for the negative. Also the following, pursuant to direction of the president:

ident:
"Mr. Allen: Present and not voting."

"The action of the senate just taken requires a ruling from the chair, and an explanation of that ruling is eminently proper at this time.

The parliamentary question presented is, whether this bill has been duly passed. It has received the votes of a majority of all the senators elected to the senate. It has received all the affirmative votes which the constitution requires to pass such a bill. This bill, so far as the affirmative vote necessary to its passage is concerned, is controlled by section 15 of article 3 of the constitution, which only requires a majority of all the senators elected.

quires a majority of all the senators. The provisions of which, it is claimed, however, a charge is made against the State, and is therefore, subject to the provisions of section 21 of the same article of the constitution. That section is substantially as follows: 'On the final passage in either house of the legislature of any act which appropriates the public money, or makes a loan to be taken by ayes and nays, which shall be duly entered on the journals, and three-fifths of all the members elected to either house shall, in all such cases, be necessary to constitute a quorum therein.' It does

be necessary to constitute a quorum in order to be so worded. It does not do this. It says three-fifths of all the senators elected shall vote for the bill, or that such a number shall vote at all upon the bill, but simply that such a number must be present in order to constitute a quorum. It then says that the majority of its order passed shall be sufficient. It is then intended that more than a majority should vote for such a bill to secure its passage, or that there should be three-fifths voted evidenced by the yeas and nays, it could have been easily so stated. The constitution was plain and only one thing was intended. If the constitution was intended to be so worded there should not only be a majority vote in favor of bills of such importance, which create debts or any

proprate public moneys for public purposes, but that when they are finally voted upon in the legislature there should be more than a bare majority present, to wit, three-fifths of all the members elected.

If three-fifths are in fact present, they need no necessarily vote upon either side. The constitutional requirement is fully complied with by the fact of their presence. There need not be three-fifths voting, but three-fifths must be present to constitute a quorum when the majority pass the bill. The ayes and nays as given upon either side may be the evidence of the fact of their presence upon either side, but it is not the evidence, much less the only evidence, of the passage of a constitutional quorum. There may be a full senate present, and a majority may vote for such a bill, and the balance for good reasons may be excused from voting, yet nevertheless the bill is legally passed, although the record of the ayes and nays will show that three-fifths voted. The sole and only criterion from which to determine who are present. Neither the constitution, the statutes, nor the rules of this senate make it so.

"The presence or absence of senator is a physical fact known to the people and the clerk of the senate. It requires only common sense or their senses to determine the question if a stranger should intrude himself into a senator's seat and insist upon responding to that senator's name when it is called, it would be the clear duty of the clerk not to record the vote, and the duty of the president of the senate to see that it was not recorded. The presence or absence of a senator, when the clerk calls his name, is therefore absolutely immaterial. Whether the senator is in truth present, or whether he himself respond, is a question for the observation of the officers of the senate, who are expected honestly and truthfully to determine.

"In fact to-day there are present over three-fifths of all the senators. They sit in their seats before me. Rule 14 of the senate requires each senator to vote when his name is called, but a number—more than enough to constitute the requisite three-fifths—refuse to vote at all, either for or against the bill, and remain silent. It is claimed that, therefore, they are to be deemed absent, and cannot be counted as constituting a quorum. They are not absent, within the meaning of the rules, because they are in fact present. They are not 'members of the house' or other procedure constituted to compel their attendance, because they are not absent. Their action is in defiance of the rules of this body, factious, and revolutionary.

this body, factious, and revolutionary.
 "If, because they refuse to be present to their names when called, they are to be deemed absent, of what use are the rules of this body and the law which gives this body authority to send its sergeant-at-arms for its absent members, and forcibly bring them into this chamber, if, when brought in, they can still refuse to vote and still be deemed absent? It would show that the rules and the provisions in the rules and in the laws were entirely nugatory and of no force or effect. There is no principle of parliamentary law which permits a senator to be present in his seat and refuse to respond to his name, and then be allowed to insist that he is present and that he does not want to be present, and that he must remain away from the chamber. This is common sense, and it is not antagonistic to parliamentary law.

"If a senator is in fact present, his refusal to vote, which is a violation of his duty, does not make him absent in a parliamentary sense. He can be counted by the clerk and president as one of the three-fifths necessary to constitute a constitutional quorum. It is peculiarly the duty of the president to see whether or not there is present a requisite quorum. It is made his duty by rule 6 of this senate to certify the passage of all bills, and to certify the fact whether they are passed by the required vote and in the presence of a constitutional quorum present. His certificate is evidence of those facts to the governor, the secretary of state, and to all the world. He is the one held responsible for the truth or falsity of the certificate. He may obtain the information as to the number of senators who are actually present when a bill is passed either from his own observation, or from the tally-list, if that shows it, or from the journal kept by the clerk.

There is no precise or prescribed method laid down either in the constitution or law, or in the rules of this body, as to how the presiding officer shall ascertain what number of senators were present. It is entirely left to the discretion of the presiding officer, as he is required to know how many days senators have attended the senate before he gives the certificate which entitles them to draw their pay. The only way which makes the tally-list showing who voted the only one which makes the number of senators present when a bill is voted upon.

"The president of the senate is bound to know and certify as to whether there was present the requisite quorum, and as his certificate is the evidence of such fact the question presented is peculiarly within his province. It is very proper that the journal should show who were present at the time that the bill was passed; not only for the corroboration of his certificate, but sometimes for his information. He may have called a senator temporarily to the chair and a bill, like the one in question, may have passed in his absence, and on his return to the chair he may be called upon to certify that the certificate of the previous day is well in all such cases. It is well known that the clerk should always keep a record as to what senators are present when a bill is passed."

"If they vote he is bound to make a record of it, and if they are present and refuse to vote, he sees and knows the fact and should make record of that fact also. Then the record will show the exact truth and will harm no one. The presiding officer can make up his certificate to the bill, not only from his own observation but, in addition thereto, from the journal kept by the clerk. It is very clear and the course will answer every requirement of the law and the constitution. The assertion that whether a constitutional quorum is present on the passage of a bill is only to be determined by whether or not a constitutional quorum voted, and by that fact alone and without reference to anything else, has no substantial foundation on which to stand.

"The jurat or certificate which the presiding officer of each house has always signed to such bills from time immemorial is that the bill received a majority of the votes of all the senators elected, 'three-fifths being present,' not three-fifths voting. The question as to how many voted in addition to a majority is wholly immaterial so long as three-fifths are present. Their presence is not to be determined solely and only by the yeas and nays.

"I have accordingly directed the clerk as he called the names of the senators who were present but who refuse to vote, to mark opposite their names on the tally-list kept by him, and which is to be entered in the journal, the words 'present but refused to vote,' and he has done so in each case. Therefore, in accordance with the record so made, which shows that there are present over three-fifths of all the senators elected, and who agree with my own observation, I do hereby declare that this bill, having received the votes of a majority of the senators elected, three-fifths being present, has been duly and legally passed.

"Ordered, That the clerk return said bill to the assembly with the message that the senate have concurred in the passage of the same with amendments."

From this decision Mr. Crisp appealed, which said appeal was debated on that and the subsequent day (see Record), at the conclusion of which it was laid on the table, on motion of Mr. McKinley, by yeas, 162; nays, 0, the speaker as before directing the clerk to enter upon the journal the names of certain members as "present and declining to vote." Thereupon the speaker stated that "162 members, as shown by the roll-call, having voted in the affirmative and none in the negative, that number in addition to the members above named recorded as present and refusing to vote, constituted a quorum, and that the said motion to lay on the table said appeal was agreed to."

The following extracts from the last edition (ninth) of Cushing's Law and Practice of Legislative Assemblies on the subject of "quorum," are also given in accordance with numerous requests therefor, together with the citation from Blackstone's Commentaries referred to in paragraph 247:

246. It being a general rule, that where authority is conferred upon several persons to be exercised with others, all the persons authorized must be present in order to exercise it, and that authority delegated to the discretion of an individual, can not be delegated by him to another; it would be a consequence of these principles if they were strictly applied to the proceedings of legislative assemblies, the members of which have but a merely delegated authority themselves, and constitute a representative body, that the members must all necessarily be present and concur, in order to the doing of any valid official act. But this would be extremely inconvenient, in general, and, in the greater number of our legislative assemblies, which are bodies of considerable size would render their proceeding wholly impracticable. Hence it has been found indispensable, in the constitution of legislative assemblies, to make them, with exception in both these respects, to the general principles above stated.

247. In all councils and other collective bodies of the same kind, it is necessary, therefore, that a certain specified number, called a QUORUM,* of the members, should meet and be present, in order to the transaction of business. This number may be precisely fixed in the first instance, or some proportion may be established, leaving the particular number to be afterwards ascertained, with reference to each assembly, and this may be done either by usage or by positive regulation; and, if not so determined, it is supposed that a majority of the members composing the body constitute a quorum. If the required number is not present at the time appointed for the meeting of a legislative assembly, the members can ordinarily do nothing more than adjourn from day to day, and wait for the requisite number, unless they

are specially authorized to take measures to compel the attendance of absent members. In this country the number necessary to constitute a quorum is, in all the States respectively, and in the Congress of the United States, regulated by constitutional provisions.

251. When the number of which an assembly may consist at any given time is fixed by constitution and an aliquot proportion of such assembly is required in order to constitute a quorum, the number of which such assembly may consist and not the number of which it does in fact consist at the time in question, is the number of the assembly and the number necessary to constitute a quorum is to be reckoned accordingly. Thus, in the Senate of the United States, to which, by the constitution, each State in the Union may elect two members, and which may consequently consist of two members from each State, the quorum is a majority of that number whether the States have all exercised their constitutional right or not. So, in the second branch of Congress, in which, by the constitution, the whole number of Representatives of which the House may consist is fixed by the last apportionment, increased by the number of members to which newly admitted States may be entitled, the quorum is a majority of the whole number, including the number to which new States may be entitled, whether they have elected members or not, and making no deductions on account of vacant districts.

258. The right of the members of every legislative assembly to have the presence and attendance of other members in order to a due organization of the assembly has already been treated of in the preceding section in connection with the number necessary to constitute a quorum. Very nearly akin to this right is that of the assembly itself after it is constituted to have the attendance of all its members for the transaction of business.

The present House being composed of 332 members a quorum of a full House is 167.

See statement of Speaker Carlisle as to quorum.—Record, 1, 49, p. 4338.

See question of order raised by Mr. Crisp in this connection and statement of Speaker Reed.—Record, 1, 49, p. 10,235.

A quorum of the Committee of the Whole House on the state of the Union * * * "shall consist of one hundred members."—Rule XXIII, clause 2.

A quorum is not required in the Committee of the whole House on a motion that the committee rise, for the reason that it is the equivalent of the motion to adjourn in the House, on which a quorum is not required, and also for the further reason that as the motion to adjourn has been held not to be "business," the motion that "the committee rise" is governed by the same rule.—See Journal, 1, 44, p. 1,153, and also Congressional Record, 2, 46, p. 3,670, vol. 43.

The point of order that "no quorum" is present or has voted can only be raised (and sustained) on a question on which a quorum is required.—Journal, 1, 51, p. 984.

When, from counting the House on a division, it appears that there is not a quorum, the matter continues exactly in the state in which it was before the division.—Manual, p. 170.

When a rising vote is taken and the Chair announces the result it is in order for any member, if no quorum has voted, to make that point of order, and it then becomes the duty of the Chair to appoint tellers (see Rule 1, clause 5). But if tellers are demanded and refused by the House (or committee) it is then too late under the practice for the point of "no quorum" to be made.—See Record, 1, 50, p. 5362.

A quorum of the House for the purpose of choosing the President shall consist of a member or members from two-thirds of the States.—Const., 12, p. 29.

Tellers may be ordered upon motion, seconded by at least one-fifth of a quorum of the members.—Rule 1, clause 5. See ruling of Speaker Reed as to the methods of ascertaining a quorum on seconding a motion to suspend the rules.—Journal 1, 51, p. 243.

The Speaker each day on the meeting of the House, "and on the appearance of a quorum, shall

* For origin of this term see Blackstone's Commentaries, 1, 361.

cause the Journal of the proceedings of the last day's sitting to be read."—Rule 1, clause 1. It was formerly a very common practice, when no quorum was present upon the Speaker taking the chair, for him to entertain a motion for a call of the House before causing the Journal to be read.—Journal, 2, 27, p. 678, 679, 1, 35, p. 840. See also Journal 1, 50, pp.

Where less than a quorum is present, a motion to take a recess is not in order; and no motion is in order except for a call or to adjourn.—Journals, 1, 29, p. 356; 2, 29, p. 343; 2, 32, p. 388. Where the rule (or order of the House) fixes an hour for taking a recess, it is not necessary that a quorum should be present at the hour so fixed.—Journal, 1, 51, pp. 915, 916. Of course it would be otherwise in case of an independent motion (if the point were made), but in the case above cited the recess was taken under a rule for the consideration of another (private) class of business.

A quorum is not required on a motion to order a call, or dispense with further proceedings under a call.—Record, 2, 43, p. 1731. Under the practice a quorum is not required on any motion or proposition relating to a call.

A resolution (or motion) revoking leaves of absence does not require a quorum, being a proceeding to compel the attendance of absent members.—Journal 1, 48, p. 621.

Whenever a committee of the whole house finds itself without a quorum, the chairman *shall* cause the roll to be called, and thereupon the committee *shall* rise, and the chairman *shall* report the names of the absentees to the House, which *shall* be entered upon the Journal; but if on such call a quorum *shall* appear, the committee *shall* thereupon resume its sitting without further order of the House.—Rule XXIII, clause 2.

The words italicized are so printed for the purpose of calling attention to their mandatory character. They are positive in terms, and specifically direct what course shall be pursued in the event of the failure of a quorum to vote on any proposition.

It has been once held that a motion "that the committee rise" is first in order whenever a vote by tellers discloses the absence of a quorum, or even after the chairman has directed the roll to be called and before the first name thereon has been called; but the later—and undoubtedly correct—practice of the House is for the chairman, as soon as the final vote is announced and the point that "no quorum has voted" is made, to direct the roll to be called, as prescribed by clause 2, Rule XXIII.

There must be a quorum on record before the House can proceed to business.—Globe, 2, 30, p. 624.

Where the roll-call discloses the absence of a quorum, the chair cannot go outside of the record in deciding as to the presence of a quorum.—Journal, 1, 44, p. 1,078.

When a vote taken by yeas and nays shows that no quorum has voted, it is the duty of the chair, under the constitution (1, 5; 1, 5) to take notice of that fact.—Journal, 1, 48, pp. 1,385, 1,386.

The House thereby becomes constitutionally disqualified to do further business, except that business which the constitution authorizes the House to do when a quorum is not present, *i. e.*, to adjourn or order a call of the House.—Congressional Globe, 2, 42, p. 3,857; proceedings May 24, 1872.

On the demand of any member, or at the suggestion of the speaker, the names of members sufficient to make a quorum in the hall of the House who do not vote shall be noted by the clerk and recorded in the Journal, and reported to the speaker with the names of the members voting, and be counted

and announced in determining the presence of a quorum to do business.—Rule XV, clause 3.

See instance where Speaker Reed counted the House, and debate and ruling thereon.—Journal, 1, 51 (Feb. 17, 1890), and Record of that date.

In this case the House was dividing by tellers on seconding a motion to suspend the rules, and the tellers reported yeas 114, nays 8. The point of order being made that no quorum had voted, the speaker thereupon counted the House and announced that 172 members—a quorum—were present and that the motion was seconded.

The point of order was debated at length; and the final ruling of the speaker—no appeal being taken—is herewith given:

The speaker said the provision of the rule—second clause of the twenty-eighth rule—is somewhat peculiar. It provides that a motion to suspend the rules shall, before being submitted to the House, be seconded by a majority by tellers.

Perhaps a very proper construction might be, that those who passed between the tellers are alone to be considered in the determination of the question of a second, it being immaterial whether or not a quorum expressed an opinion or were present, were it not for the fact that a quorum must be present at all times in order to transact business. Therefore, the question before the House is a question very much like that which has been passed upon already repeatedly by the House of Representatives.

Under the constitution of the United States it is necessary that a quorum, or a majority of the members, shall be present in order to transact the public business. Whether it is necessary for them to act or not is the point in dispute. Since that question has come up in the House, the matter has been discussed from one end of the country to the other, resulting in a display of precedents and in judgments of courts which can leave no doubt in the mind of any one who has examined them. The courts of very many of the States and the legislatures of very many of the States have taken that course in regard to the matter, so far as the principle and practice are concerned, which has been indorsed by the House of Representatives.

We must, therefore, in this House at least, consider the question settled that if a majority are present to do business, their presence is all that is required in order to make a quorum. If they decline to vote, their inaction cannot be in the pathway of the action of those who do their duty. The idea that silence can be stronger than a negative vote seems to have been unknown to our ancestors. It seems to be a modern parliamentary fiction which has never been able to stand the examination of courts where business questions were involved. I have yet to see a single decision of a court against the position which has been lately taken by the House of Representatives.

The only question, then, remaining is one of detail: By what method shall the presence of a quorum be ascertained? I think an examination of all the records of parliamentary practice will show that it has been the custom from time immemorial for the presiding officer to determine, in such manner as he deems accurate and suitable, the presence of a quorum. The rules of this House contain nothing derogatory, not to that power, for it is not a power in his hands—it is merely the performance of his duty. He can do it by a count which satisfies him, or, if it is seriously questioned, as it has not been in this case, the fact can be ascertained by other methods.

In truth, in the earlier days of the House of Representatives the determination of a vote was made even by tellers differently from what it is now, there being two tellers to take the affirmative and two others to take the negative vote. If it be remembered that evil is likely to follow from any misconduct on the part of the person who counts, the answer is very simple. It is, that whatever officer is intrusted with the duty of taking a count, whether of a vote or of the presence of a quorum, is liable to the same objection, and that objection, which is inherent in all human affairs, is not to prevent action, which always proceeds upon the assumption of the right performance by public officers of their public duties.

Moreover, in the House of Representatives a correction of any material mistake is made very ready and very simple, because if any number of members, equal to or exceeding one-fifth, have doubt in regard to the transaction, they have the right to demand the yeas and nays upon the passage of the bill, or upon questions arising. Under those circumstances it seems that there can no evil follow from the practice. If members who are present and who are silent desire to record themselves against a measure they have full opportunity to do so. In this case the chair had repeatedly counted the House during the vote, and after the voting had ceased and before it was announced, and therefore, being satisfied that a constitutional quorum was present to do business, the chair announces that the yeas are 114 and the nays 8, and that the motion has been seconded.

QUO WARRANTO, a writ by which the government commences suit to recover an office, franchise

or privilege from a person or corporation which is illegally in possession of it. It is a proceeding to try the right to the office or franchise, and to recover it eventually. In the United States it has been superseded by what is called an *information* to the court in the nature of a *quo warranto*. The person at whose instance it is instituted is called the "relator." In the case of any public officer *quo warranto* proceedings are instituted at the suit of the attorney-general, or at the suit of any person interested, as for instance, of a man elected to the same office. The State is not bound to show anything, but the defendant is bound to show in court his right to the office in question.

The judgment against an officer in illegal possession of an office is *ouster*, that is, the judgment simply puts him out. Against a corporation in illegal possession of a franchise the judgment is *ouster and seizure of the franchise*. This is done when a corporation has violated the conditions of its charter, and is to be deprived of it. Such *forfeitures* may be brought about in two cases: (1) In case of "perversion," as when a corporation does acts inconsistent with the nature of the franchise, and which are injurious to the public; and (2) in case of "usurption," as when a corporation exercises powers which it has no right to exercise. See *Britannica*, Vol. XX, p. 189.

